NEW ZEALAND
JOURNAL OF

Agriculture

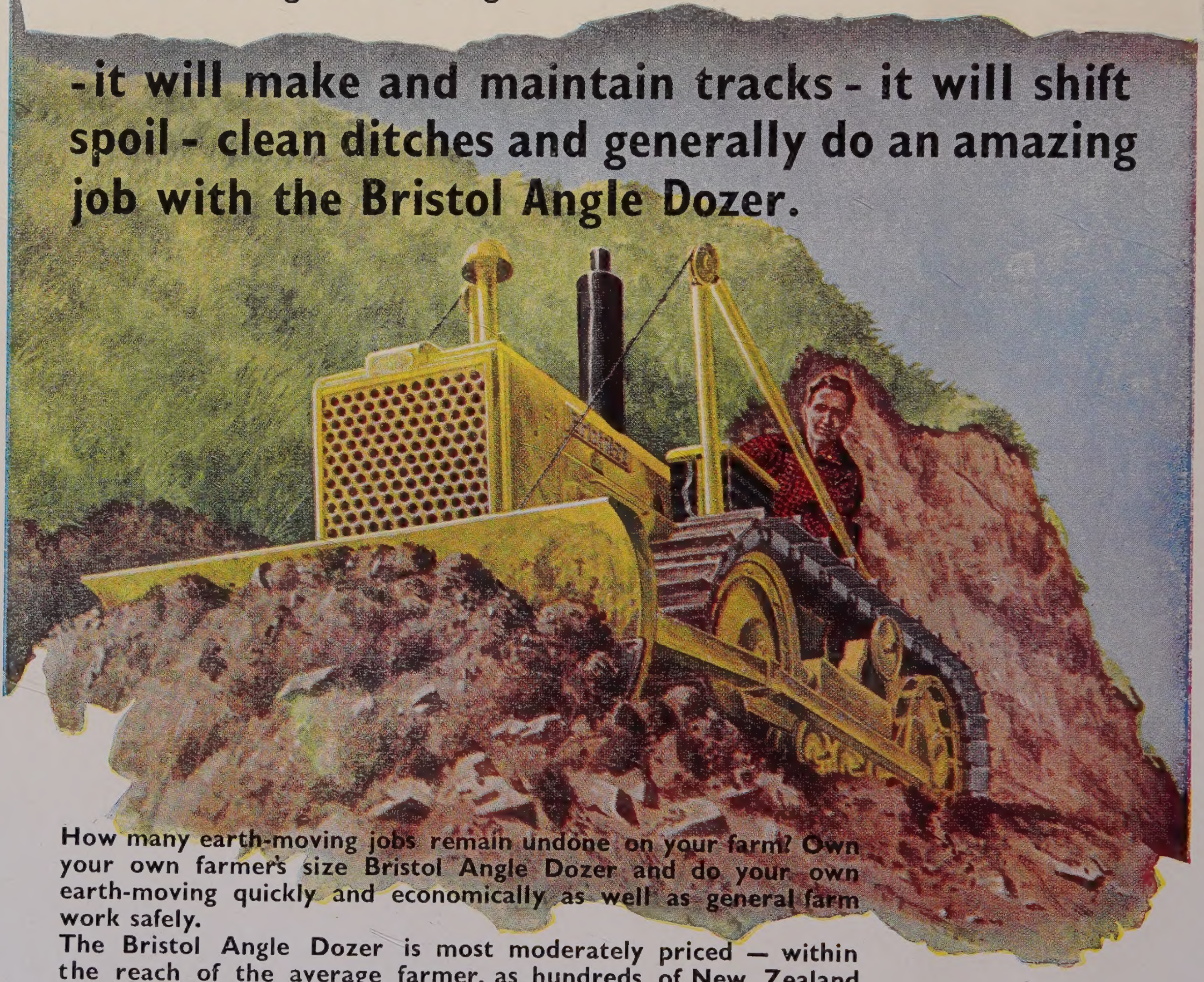
JANUARY - 1954

COMMONWEALTH MYCOLOGICAL INSTITUTE
21 APR 1954

Greatest Crawler Tractor Value in the Country!

The New British Bristol-22

will do more for you than ploughing, discing, harrowing, hauling, mole-draining and seeding -



-it will make and maintain tracks - it will shift spoil - clean ditches and generally do an amazing job with the Bristol Angle Dozer.

How many earth-moving jobs remain undone on your farm? Own your own farmer's size Bristol Angle Dozer and do your own earth-moving quickly and economically as well as general farm work safely.

The Bristol Angle Dozer is most moderately priced — within the reach of the average farmer, as hundreds of New Zealand farmers have proved.

There is no better Buy available today!

Write for the full details of the new Bristol 22

P.O. Box 1321 IBL *Ivory Bros. Ltd.* Wellington

Branches and agents throughout New Zealand

Volume 88
Number 1
15 January
1954.
(Established 1910)

NEW ZEALAND JOURNAL OF Agriculture

Published by
Direction
of
Rt. Hon. K. J. Holyoake,
Minister of Agriculture.

This Month's Cover

Artistic arrangement of flowers in the home involves much more effort and care than that required for piling masses of blooms of all types into whatever containers are available. Essential principles must be considered, such as the suitability of flowers for the interior design of the home, the size and shape of containers, and choice of accessories. In a series of seven articles, the first of which is in this issue, Margaret O'Brien, Horticultural Department, Massey Agricultural College, Palmerston North, describes the principles of proper flower arrangement, an example of which is shown on this month's cover, which was reproduced from an illustration prepared by L. Cutten.

New Zealand Department of Agriculture

HEAD OFFICE:
Dominion Farmers' Institute Building,
Featherston Street, Wellington.

DIRECTOR-GENERAL:
E. J. Fawcett

ASSISTANT DIRECTOR-GENERAL:
R. B. Tennent

DIVISIONAL DIRECTORS:

Animal Industry	J. E. McIlwaine
Animal Research	J. F. Filmer
Dairy	H. A. Foy
Extension	P. W. Smallfield
Horticulture	A. M. W. Greig
Marketing	K. B. Longmore

Editor: G. J. Neale

TABLE OF CONTENTS

25 Tractor Fatalities in 1952	C. J. Crosbie	2
Foot-rot and Necrotic Ulcer Diseases in Pigs	E. D. Edwards	11
Infertility in Cattle and Sheep	J. F. Filmer	15
Lambing Estimates for 1953 Highest Recorded		17
Advantages of Chemical Caponisation of Cockerels	F. C. Bobby and W. R. Belworthy	19
Domestic Beekeeping	T. P. J. Williams	23
Flushing of Ewes in Fat Lamb Production	J. C. Gerring	25
Spread of Poisonous Cape Tulip Must be Checked		27
Opening of Y.F.C. Memorial at Lincoln		29
Preventing Outbreaks of Facial Eczema	J. F. Filmer	31
Surpluses and Shortages in World Food		32
Mixed Farming on Winchmore Irrigation Research Station	G. K. McPherson	33
The Home Garden	D. W. McCallum and S. O. Gillard	41
Meteorological Records for November		46
Radio Broadcasts		46
Land Improvement: Development of Deteriorated Hill Country	R. S. Whitehead	47
Repairing a Bee Smoker	T. P. J. Williams	49
Planned Farm Layout is Key to Efficient Dairying	F. T. Lees	51
Manurial Responses on Some Marlborough Soils	W. F. Leonard	59
Replacement Policy with Household Poultry	H. K. Mullins	65
Show Dates		66
Synthetic Soil Conditioners	G. R. Moss, H. A. Browning, and T. F. Southon	67
Care of Livestock during February		70
Dairy Produce Graded for Export		70
Summer and Autumn Supplementary Feeding Crops (Seasonal Notes)		71
Risk of Eye Injuries on Farms		73
Recent Research Work: Foliar Spray Application of Phosphates		74
Break Grazing in Auckland Province with Electric Fence	J. E. Bell	75
Quickly Made Jams	Betty Johnston	77
Designed Flower Arrangement	Margaret O'Brien	82
Child's Bright Fair Isle Jersey		87
Sweet Corn	Betty Johnston	89
The Flower Garden	M. J. Lockie and H. P. Thomas	93

SUBSCRIPTION RATES

The "Journal" is issued monthly. The subscription within New Zealand is 10s. a year; the overseas subscription is 13s. (sterling). The "Journal" may be ordered from any bookseller or newsagent, or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 2298, Wellington, at 1s. a copy, post free.

Subscription inquiries (preferably accompanied by the address cut from a recent "Journal" wrapper) should be sent to the nearest office of the Department of Agriculture.

COPYRIGHT PROVISIONS

Articles in "The Journal of Agriculture" are copyright, but may be reprinted, **provided both the "Journal" and author are acknowledged.**

The Minister of Agriculture does not accept responsibility for any of the private and trade advertisements included in this publication.

All correspondence relating to the "Journal" should be addressed to the Editor, "The New Zealand Journal of Agriculture", P.O. Box 2298, Wellington.

REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE.

25 Tractor Fatalities in 1952

IN 1952 there were 25 fatal tractor accidents on New Zealand farms and the case histories of these distressing happenings compiled from reports furnished by officers of the Police Department and agricultural instructors are published here so that operators of farm tractors will be better able to understand their machines and their working. This article by C. J. Crosbie, Machinery Instructor, Department of Agriculture, Christchurch, presents all the known facts about each fatality. In next month's issue the same author will give an analysis of the 63 tractor fatalities that have occurred in the 4 years 1949 to 1952 so that tractor operators will be able to benefit from the lessons to be learnt.

Deaths of Children

THE most tragic feature of tractor fatalities in 1952 is that 6 children lost their lives, five of them when they were allowed to ride on tractors. The following cases all occurred with wheeled tractors:—

1. A 9-year-old boy, a son of the tractor driver, was allowed to stand on a semi-mounted trailer mower and hold on to the back of the driver's seat while the machines were working in the field. There was no safety shield in place over the power take-off shaft to the mower, even though one had been supplied by the manufacturer of the mower for just that purpose. As the day was cold, the boy was wearing an old long overcoat. It must have become caught in the bare revolving power shaft, and before the boy had time to shout a warning to his father he was pulled down and thrown under the mower, which caused such crushing injuries that he subsequently died.

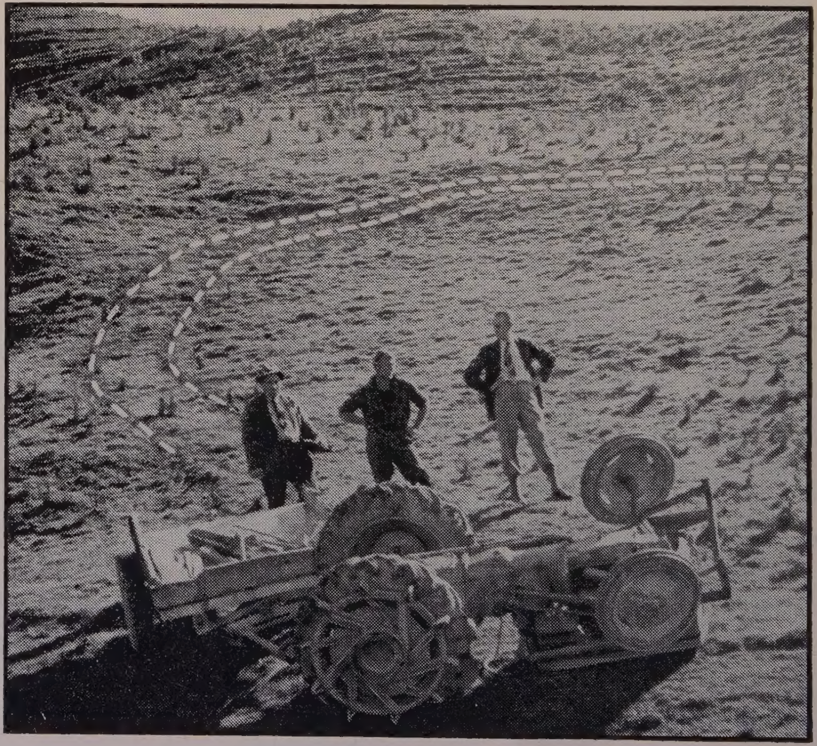
2. A farmer was rolling a stony field with a tractor and 7-ton roller hitched to it. He had his son aged 3 years 9 months sitting on a 4-gallon oil drum on the footplate of the tractor beside him. The boy had on numerous occasions ridden on the footplate, and on this occasion the bottom rim of the oil drum was placed over a protruding bolt in the footplate so that the drum would not shift. After travelling about 11 chains on a straight course and with the boy under his constant observation the driver turned a corner which fully occupied his attention. After straightening up and travelling about 12yds. he noticed that the boy and the drum were missing. He stopped the tractor immediately and on looking back saw his son lying on the ground approximately 10ft. behind the roller, which had passed over him, causing instantaneous death.

3. A 3-year-old boy was killed when he was out on a tractor with his father, who was driving along a farm road and stopping at intervals to unload fencing battens from the trailer. The tractor was an old model on steel wheels with lugs and had no brakes. At the time of the accident the tractor was left stationary on a slight uphill gradient with the motor running and the vibration of the motor set the tractor moving slowly backward. The child, who was standing on a ledge behind the tractor seat and apparently holding on to one of the spade lugs, lost his balance and fell between the tractor and the trailer, where he was crushed by a wheel of the tractor.

4. When he crawled beneath a tractor that was jacked up for an overhaul a 22-months-old boy was killed when the tractor slipped off the jack and fell down and crushed him. The 4 wheels had been lifted clear of the ground by a jack placed under the rear of the tractor and linked to the tractor's own hydraulic lift and by a prop placed on a piece of 4in. x 1in. timber and under the front of the tractor. The front wheels had been removed and the men were working at the rear of the tractor. Just as it was noticed that the small boy had crawled under the tractor the piece of timber split, allowing the bottom of the prop to slide forward and the front of the tractor to drop to the ground. The reason for placing a piece of timber under the front prop was not given. As the wheels had been removed, the stub axles hit the ground and there was very little clearance under the sump of the engine.

5. The practice of allowing children to drive or ride on tractors was condemned as "little short of criminal negligence" by a district coroner when he was conducting an inquest into the death of a 5-year-old girl who fell off a tractor and under the blades of a rotary mower. While he was topping a flat field with a tractor-drawn rotary grass mower a farm hand had four of his daughters on the tractor with him, two (aged 12 and 5 respectively) on the bonnet of the tractor and two standing on his left and right on the differential housing and holding on to

THE TOTAL OF TRACTOR FATALITIES IN 1952 WAS THE HIGHEST IN NEW ZEALAND'S HISTORY.



A tractor with a trailer was being driven in third gear across a steep face after a heavy frost when the rear wheels started to skid sideways. The driver corrected this by turning downhill. The machine picked up speed and when the driver turned sharply to the left to avoid a gully it rolled over and he was crushed. He was found dead under the mudguard on the uphill side. The course of the tractor is shown by the broken white lines.

the mudguards. After four rounds of the field had been completed the driver saw the two girls on the bonnet lose their balance. The younger girl fell to the ground, where the tractor wheel passed over her. When the tractor was stopped she was found under the rotary mower, where the rotating blades had inflicted injuries from which she died before the doctor arrived.

6. A 4-year-old boy was sitting on the footplate of a tractor driven by his father. The tractor was towing a hay baler and a trailer with approximately 2 tons of hay on it. Two other boys, sons of the tractor driver, were riding on the trailer. When the small boy slipped off the footplate on to the ground his father put the tractor out of gear, applied the brakes, and reached over to lift the pick-up of the baler so that it would clear the boy on the ground. The brakes were unable to stop the combined weight of the tractor, baler, and loaded trailer in the short distance required and the wheel of the baler passed over the boy, inflicting fatal head injuries.

Deaths of Adults

In addition to the 6 children killed with farm tractors last year, 19 adult tractor drivers lost their lives. Four of them were operating tracklaying tractors and 15 were driving wheeled tractors.

Tracklaying Tractors

7. When he was giant discing a steep slope, estimated to be 25 to 40 degrees, with a small, narrow gauge, tracklaying tractor (over-all track width 4ft. 3in.) a farmer was killed. He was working a slope above a bulldozed farm road when the discs slipped downhill toward the road and piled up soil in front of them. The extra pull required for the discs to mount the piled-up soil acting on the tractor from a downhill direction was sufficient to roll it over sideways, because the tractor was already perilously near its dynamic tipping angle. The slope at this point on the hillside was estimated to be about 40 degrees. The tractor and discs tipped over on to the farm road, at which point the tractor broke clear and rolled further down a gully. The driver was found dead on the farm road near the discs. It would seem that the driver was first thrown on to the road and was then crushed by the tractor as it rolled downhill.

8. An operator of a small, narrow-gauge, tracklaying tractor had dropped the hydraulically operated bulldozer blade where he had been working on a farm road in hill country and was returning home along the farm road when he decided to turn right on to another branch road. This branch road met the main road at a sharp angle and the surface of the branch road fell away at a measured fall of 1 in 2 along the side of a steep gully. The track marks left by the tractor indicated that the driver did not complete the full turn from one road to the other, but that when part way round the tractor continued straight on over the edge of the branch road and rolled down the gully, taking the driver with it, to pin and kill him under one of the tracks when it came to rest upside down.

It would appear that the only reason for the driver not completing the full turn was that when the tractor passed over the sharp, slightly raised "lip" where the two roads met, the nose of this short wheel-base tracklayer rose in the air and then crashed down on the steep road below, so that the driver was thrown forward on to the bonnet of the machine and was unable to get to the controls before it moved forward a short distance and on over the edge of the road.

Because of the narrow track width of this machine, the driver had been able to construct and use roads in his hill country that were definitely unsafe.

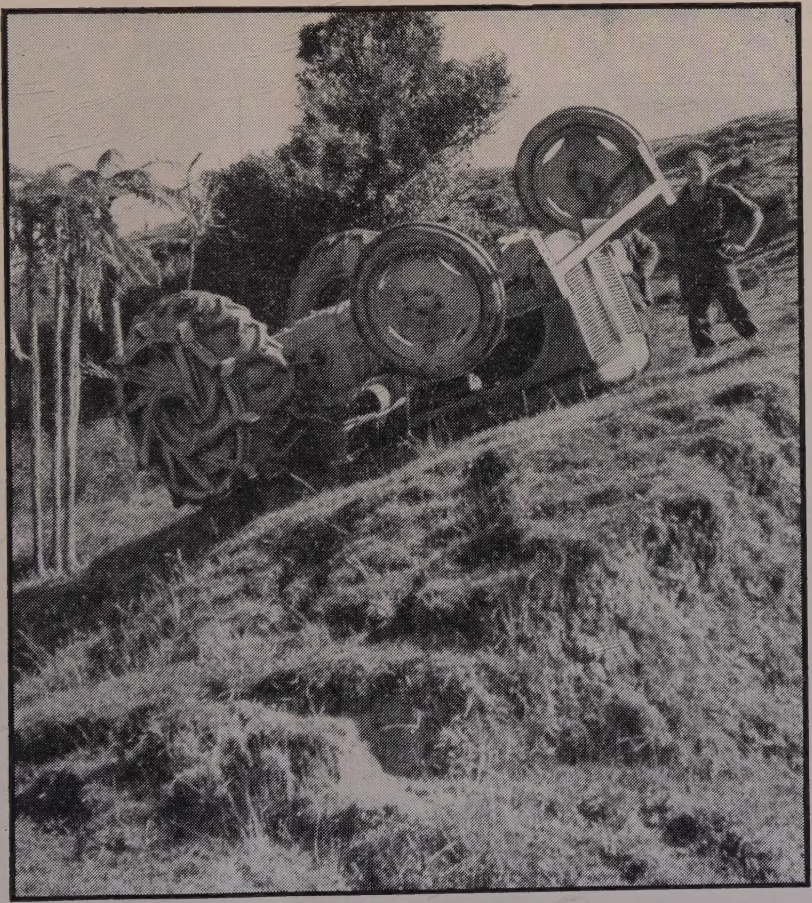
(The officers who reported the two fatalities described in 7 and 8 were of the opinion that this narrow tracklayer was most unsuitable for hill country work.)

9. A tractor driver operating a bulldozer was making farm roads on the back portion of a hill country farm and when turning on a steep facing the tractor skidded sideways on wet grass overlying limestone. The tractor went down over a 30ft. waterfall into water 5ft. deep where the driver was pinned under the machine.

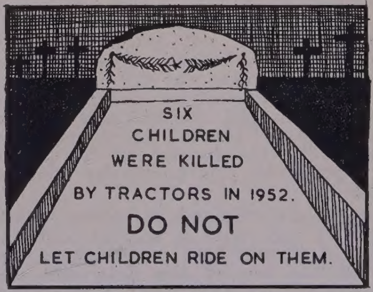
10. After backing a truck against a bank on the side of the road the driver unloaded a bulldozer by driving it on to the bank. The driver then drove this machine down over the bank on to the road 3ft. below, where the blade dug into the road and the jolt threw the driver over the machine on to the road, where he fell in front of the bulldozer and was crushed by one of the tracks.

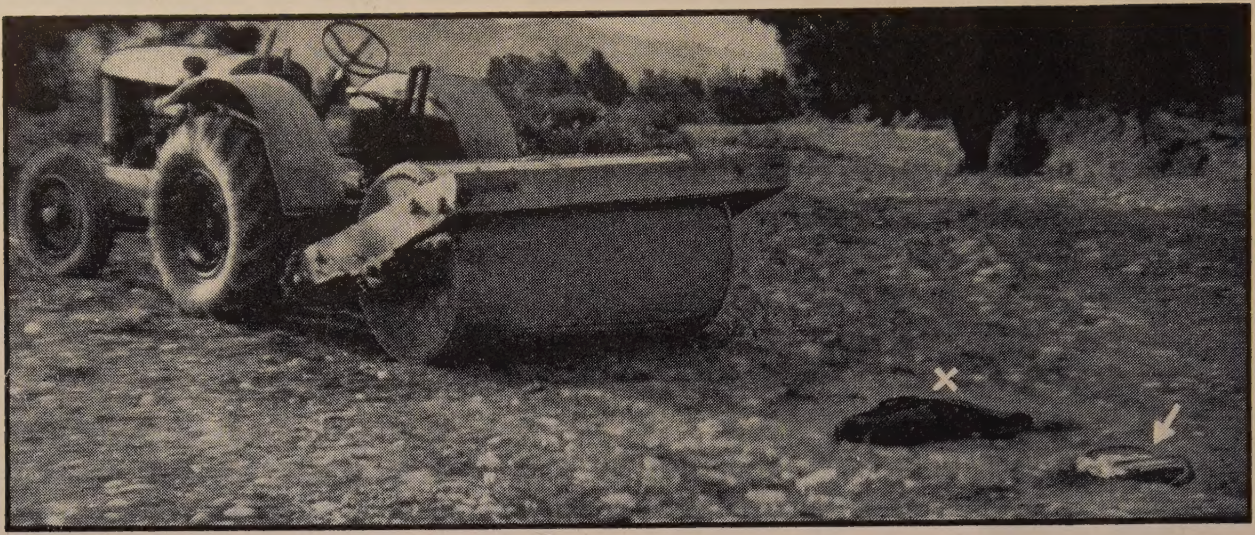
Wheeled Tractors

11. A tractor driver who was engaged in mowing hay had completed five rounds of the field when he attempted to turn on a moderately steep shelf of ground



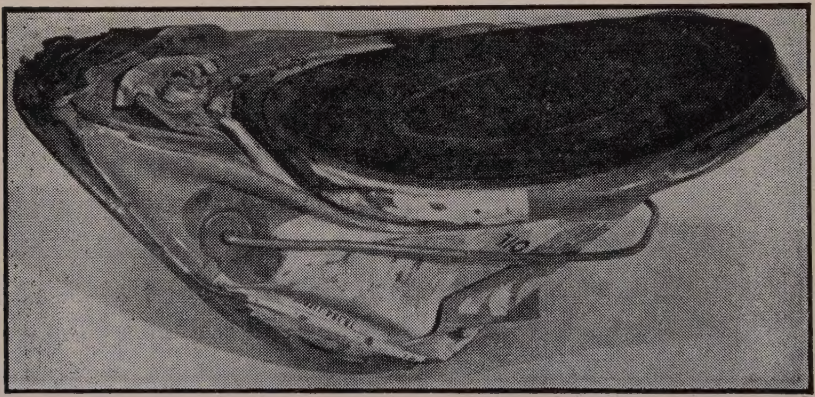
Another view of the accident illustrated on the opposite page. It shows the steep nature of the country (1 in 2 or 26½ degrees) and also that the tractor was fitted with grippers, but they are in the up position. The driver had had all the morning to let them down and had they been in this position, they would have prevented the first skid and thus averted the fatality.





Above—A driver was rolling a field to push stones below ground level and had his son aged 3 years 9 months riding on an oil drum on the footplate of the tractor beside him. Unnoticed the boy and the drum fell off and the heavy roller passed over them. The coat in the illustration (indicated by a cross) marks where the boy was found. The drum, pressed into the ground, is indicated by the arrow.

Below—The crushed drum.



between an unworkable bank and a gully. This shelf was only 29ft. wide and the over-all length of the tractor and mower was 18ft. 6in. When the unit was half round and pointing straight downhill it began to skid. The driver managed to pull the machine further round, but it skidded over the bank into a gully 21ft. deep, where it overturned to pin the driver under a rear wheel and he was drowned in a few inches of water. The tractor was fitted with grippers, but they were not extended at the time of the accident. The day was fine and the grass was dry. The tractor was in good working order and the driver had had considerable experience with it. He had previously been warned by the farmer of the danger of turning on this particular shelf of land.

12. While engaged in baling a field of hay with a tractor and hay baler a farmer had completed a run across the top of the field and was turning to the right down a slope that was not considered unsafe in the direction of the windrow. It appears that he changed his mind about the safeness of the slope and tried to turn another 90 degrees to the right and go back uphill. At this stage the tractor started to travel sideways down the slope, gathering momentum. When it was travelling rapidly it started to straighten out; then it rolled over sideways and crushed the driver under a rear wheel. The hay baler was fitted with a single front wheel, and a yoke drawbar from the tractor to this wheel steered and pulled the baler. When the baler ran past the tractor in its skid downhill the drawbar engaged heavily on the lower rear wheel and caused the tractor to roll over. Had the baler been directly hitched to the tractor, the driver would have had more control over it.

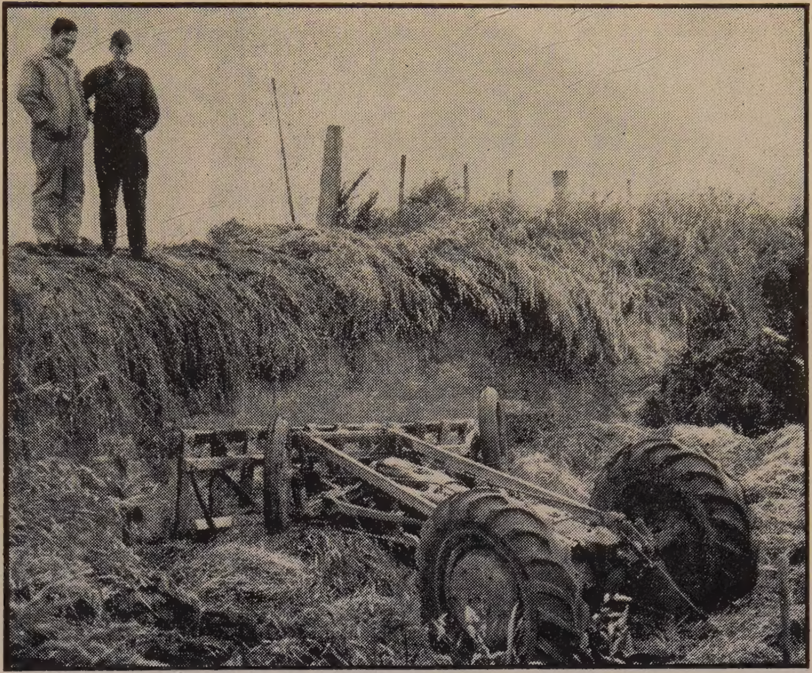
13. A tractor driver had been topdressing a field that he had previously topdressed and was returning home on completing the work with the tractor and wheeled topdresser, which was out of gear and about one quarter full of superphosphate. He did not take the usual route to the gate, but chose a shorter one which became steeper as he progressed, so that he got into difficulties and had to brake the topside rear wheel to keep on his course. This wheel skidded some 4ft. and at this stage it appears that the driver turned his machine straight downhill. With the topdresser pushing him and both brakes applied he skidded 20yds. down a slope estimated to be of a 1 in 8 grade. When he reached level ground he apparently turned to the right to avoid some scrub and a small watercourse. With the turn, and the topdresser pushing, the tractor rolled over and the driver's head was crushed under the steering wheel. The driver was a careful and very steady man, familiar with his tractor, which was in good order, and familiar with the field in which he was working.

14. With an old steel-wheeled tractor and topdresser a farmer and his driver had completed topdressing a field, except for a small, steep area. The farmer suggested doing it by hand, but the tractor driver thought it would be all right if he used the tractor and went downhill. He set off downhill in low gear and shortly afterward the farmer noticed the rear of the tractor slide sideways. The driver appeared to correct the skid by applying the brake, but the tractor continued skidding until it was sideways on, when it rolled over and crushed him.

15. A tractor driver was found dead on his machine with his head caught in the stays to the drawbar, death being due to asphyxia. The tractor was found nosed obliquely into a barberry hedge growing through a fence. The right front wheel was suspended 1ft. above ground and both rear wheels were dug in to a depth of about 10in.; the left wheel was still revolving. The driver had been levelling a flat field and wheel marks showed that after a strip a chain wide had been worked round the field the tractor veered on to the worked ground and then to the left in an almost straight line until its progress was stopped by the hedge. It is known that this driver was subject to epileptic fits lasting about 5 minutes and it is surmised that this was the reason for his losing control of the tractor and that he was thrown back off its seat when it reared on striking the hedge. The tractor was in good repair and no fault could be found that would account for the accident.

16. When he was driving home in third gear across a flat field with a tractor and a single-wheeled trailer, and running parallel to and 17ft. from the bank of a stream, a tractor driver was talking to a farmhand who was standing on the drawbar and holding on to the back of the seat. When asked "what are the gears" the driver replied that they were numbered on the gearbox; but on looking down he saw that the numbers were obscured with mud. As he bent down to clear the mud the driver unconsciously moved the steering wheel to the right so that when he looked up the tractor was right on the edge of the 10ft. bank of the stream. He was unable to stop it and the tractor stood on its nose in the stream—a slow-moving watercourse overgrown with grass—and fell over to the right, the driver suffering slight injuries only, as he was protected by a tractor cab. The farmhand was thrown over the right wheel of the tractor and landed face down in the stream, the trailer somersaulting and landing exactly on top of him to hold him in the mud and water. The tractor driver was unable to smash the decking boards of the trailer to release him and it was impossible for the driver to lift the trailer unaided. He ran for help, but when this arrived the farmhand had drowned. The tractor was in good mechanical order and the driver had had many years of tractor experience.

17. With a tricycle type tractor with a spread of 6ft. on the driving wheels a driver was engaged in crushing lupins on a hillside. When the front wheels dropped 2ft. into a hole, simultaneously with the top rear wheel passing over a large lupin bush, the tractor rolled over and landed upside down to kill the driver. The grade of the hillside was 22 degrees with the slope more easy below. The tractor was in good mechanical condition.

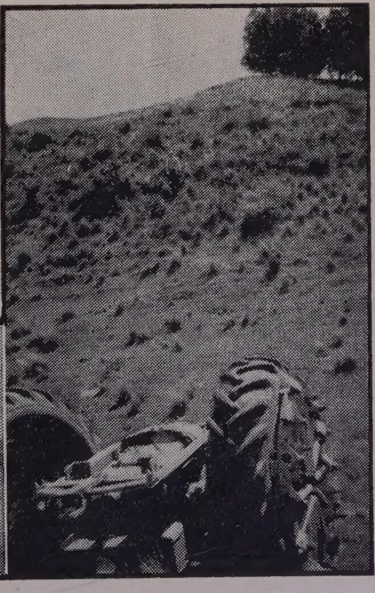


[*Roberts Photo Engravers*

The elderly driver of this tractor was sweeping silage to a pit and failed to stop the machine at the edge, with the result that it somersaulted into the pit. The driver was thrown into the pit and tried to roll clear, but the rear wheels and a mudguard caught him when the tractor came over.

18. A tractor driver was killed when his machine rolled over while he was topdressing a field. He was drawing a wheeled topdresser half full of lime and it appears the tractor got out of control while negotiating a steep gully. In an attempt to recover the tractor's stability the driver turned uphill on the angle on to a face which had a slope of 18½ degrees. The momentum of the topdresser was apparently sufficient to cause complete instability of the tractor, which somersaulted and in doing so fatally crushed the driver. The tractor was in good mechanical order, but the rear wheels were set in the narrow position. The tread of the rubber tyres was in good order. The tractor driver had had relatively little experience with the tractor, which was usually driven by his son.

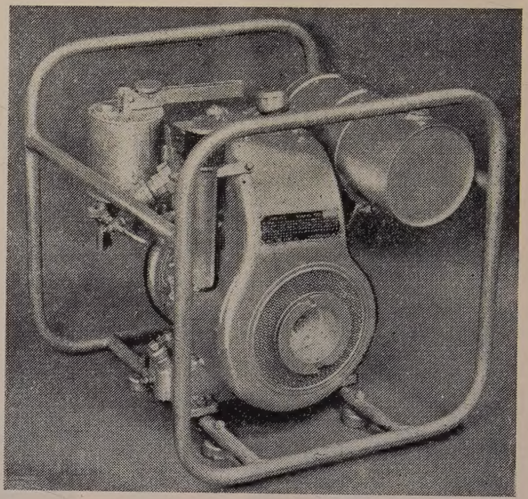
When a tractor was deliberately driven down the steep, rocky, tussock-covered benchy hillside shown at right it got out of control and raced down the slope, overturned several times on the flat, killed the driver, and came to rest in several pieces as shown below. The course of the tractor was about 300yds. of a slope of approximately 22 degrees and finally 45yds. of approximately 33 degrees.



19. A tractor driver was ploughing the headland of a flat field. The headland skirted a small creek, which was at the bottom of a fairly steep gully about 15ft. deep. He was ploughing the **last round** at a corner of the field when it appears he got too near the edge, stopped, and lifted the hydraulic, direct-mounted plough. The tractor somehow got out of control and rolled into the creek, pinning the operator underneath. When the tractor was inspected the gear lever was in reverse and the plough in the lifted position. The bank did not give way under the tractor, which had been driven or had run over the bank. The driver had owned the tractor for 12 months and was familiar with it.

20. A 16-year-old boy—a conscientious and eager worker—was engaged in placing battens along a fence, which was on the opposite side of a drain to a gravelled farm road. The drain was 3ft. deep, about 2ft. wide at the top, and overgrown with grass. The battens were loaded on an old farm dray, which had been adapted as a trailer for towing behind a tractor. The total length of the drawbar from the tractor seat to the front of the dray was about 5ft. The boy had been engaged on this work on the previous day and the accident occurred when he had unloaded only three battens from his first load in the morning of the second day. He was found lying face down in the

MY HANDY HALE *WILL SOON DOUSE THAT FIRE!*



HALE — *THE MODERN PORTABLE FIRE-FIGHTING UNIT.*

The Hale Centrifugal Fire Pump (powered by a "Briggs & Stratton") is simple, efficient and the ideal mobile fire unit for pumping water from awkward places. Special exhaust primer for quick priming. Maximum dependability . . . quality manufactured. Easily and quickly carried by two men. 100 gallons of water per minute for all emergencies. Canvas fire hose branchpipes, fog nozzles, and suction hose also available. *Please send for fullest details.*

WHEN YOUR HALE IS NOT FIRE-FIGHTING *USE IT FOR:—*

- Irrigation
- Draining
- Sprinklers
- Emergency Water Supply
- Relaying water to larger pump.

HALE

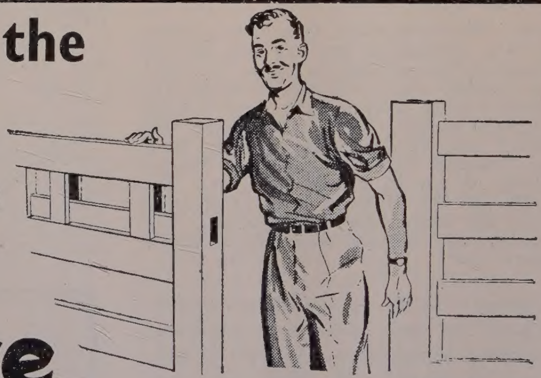
Brown Bros.
ENGINEERS LTD.

Pumping Machinery Specialists since 1908.

590 COLOMBO STREET, P.O. BOX 548J, CHRISTCHURCH.

OPEN your farm gate to the

NEW **Major** . . . coming for your TEST DRIVE



Test-drive

THE *NEW* FORDSON MAJOR

Test-Drive the new "Major" in your own paddocks, using your own plough, discs, harrows—whatever implements you have on hand. Drive it yourself? Of course! That's the only way to really experience the Major's tremendous pulling power, manoeuvrability and economy. *This demonstration will cost you nothing!* No obligation whatsoever. It's Ford's way of showing you that the New Fordson Major is "value far above the price".

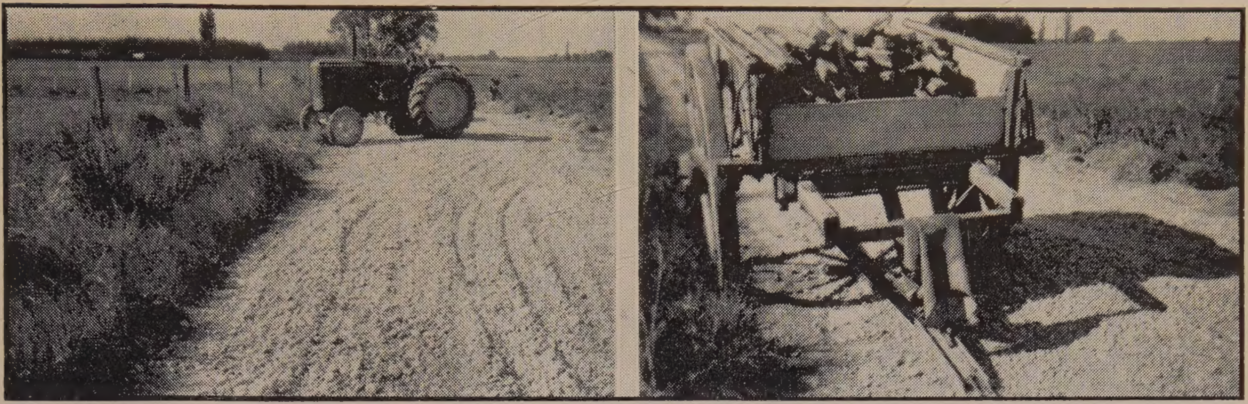
SEE YOUR FORD DEALER

Do it NOW! Ring or call on your Ford Dealer and make a date for your TEST-DRIVE.

Petrol or Kerosene	Diesel
£657 on Rubber	£801 on Rubber
£587 on Steel	£731 on Steel

Delivered any Dealer Town—
Easy Terms Available.
Prices and Specifications subject to change without notice.

FORD MOTOR COMPANY OF NEW ZEALAND LIMITED LOWER HUTT

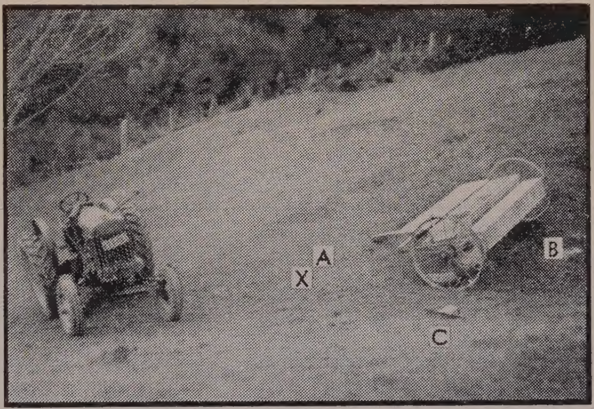


A young tractor driver was found suffocated in a drain with one rear wheel of the tractor on top of him. He had been standing on the drawbar of a cart converted to a trailer and throwing battens to a fenceline across a drain from the road. The tractor had been left to run unattended and apparently it veered toward the drain. When the driver tried to correct the tractor's movement he apparently lost his balance and fell or was carried into the drain and the tractor came on top of him. The illustrations show the scene of the accident after the tractor had been removed from the drain (left) and the cart on which the battens were loaded (right).

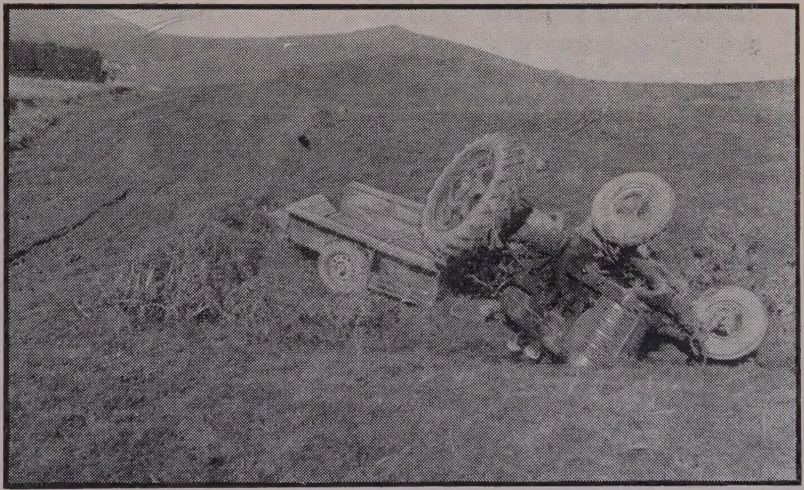
bottom of the drain with the right-hand rear wheel of the tractor across his head and the upper part of his body. Death was due to asphyxiation. Apparently he had been standing on the drawbar throwing the battens across the drain with the tractor moving unattended up the road close to the drain. It would appear that the tractor veered toward the drain and that the boy made a lunge to reach the steering wheel, but slipped on the steel drawbar, fell on to the mudguard, and slid or was carried into the drain, after which the tractor moved into the drain on top of him. An examination of the tractor showed no fault that would have contributed to the accident.

21. A driver died in hospital 7 weeks after a tractor accident while topdressing. He was operating a rubber-tyred tractor and an engine-functioned trailer topdresser. He had been asked to keep away from a steep portion of the field, but was seen to work up to the edge of the steep bank, observe it, and then proceed down it at an angle. At this stage the topdresser motor stopped. He got it going again and proceeded on in low gear. At this stage he passed out of vision. The wheel marks indicated that the tractor was turned straight downhill and somehow overturned and landed on its wheels again, facing in the same direction. The topdresser did not overturn because of a swivel hitch on the drawbar. Both units stopped at the bottom of the steep slope, which was estimated to be 45 degrees and about 60 to 70ft. high. The driver was found at the back of the topdresser, which had evidently passed over him. Examination showed there was nothing about the tractor or trailer which caused the accident.

22. A farmer was drowned in a creek when a farm bridge collapsed under a tractor he was driving and he was pinned under the tractor in about 4ft. of water. He had been topdressing and was returning home at lunch time towing a sledge. He



When topdressing a hillside the driver of a tractor got into difficulties on an 18 degree face and the tractor overturned and crushed him. He was found midway between the tractor and topdresser at X. There were indentations at A and B made by the tractor's rear wheels as it rolled over. The radiator cap had gouged into the ground at C.



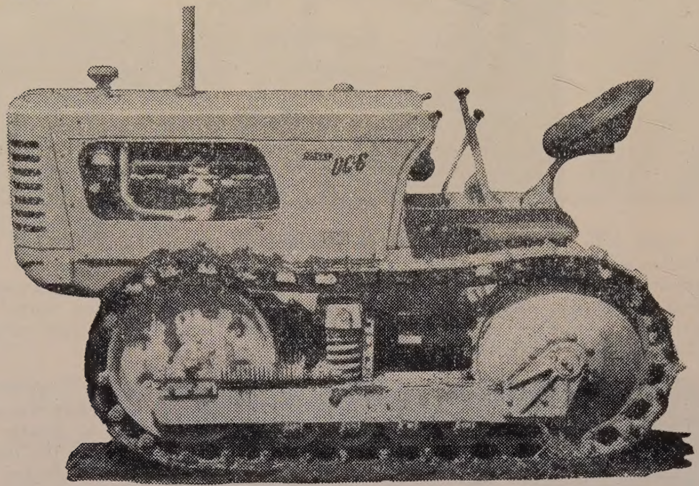
[*Standish and Preece*

When he was coming home late at night with a wheeled tractor and empty trailer an operator who was driving on the grass on the left of the track in a cutting failed to centre his machine on the track when he had to cross a filling and the left-hand wheels went over the side. As the machine continued on, the angle got steeper and steeper until the tractor rolled over. The driver, who was pinned under the tractor, died from his injuries.

A Lion-hearted Tractor that gets through a Lion's share of work!

The OLIVER "OC-6"

The "OC6", big brother to the sturdy "OC3", safely handles 2-furrow ploughs and 5-a-side giants on rugged, steep country where horses find it difficult to work and moreover can effortlessly pull a 4-furrow plough on the flat! With the addition of the "OC6" to the Oliver clan there are now six stalwart models to choose from—a crawler tractor for **every** farm ranging from the "OC3" of 22 Drawbar H.P. to the "OC18" of 130 Drawbar H.P. The low centre of gravity and wide track widths (42in., 60in. and 68in.) make the new Oliver "OC6" sure-footed on sloping fields, hard-to-work acres or hill pastures and give it more "push" on the turns in sand, mud and soft footing. Look over this new Oliver—then try it out! Remember that there is an Oliver dealer in your district.



OLIVER
AUTHORIZED
SALES
SERVICE

Sole N.Z. Distributors:
FREDERIC W. SMITH LTD.

8-12 The Terrace,
Wellington.

144 Carlyle Street,
Christchurch.

G5884.24

stantox T·45s

the LOW COST way to kill blackberry and gorse!

There is no more highly concentrated or more effective—or cheaper—spray on the market for killing gorse and blackberry! Stantox T-45S will rid your farm or roadway of these stubborn perennials without harming the grass and without any injurious effect on stock or humans. Whereas hand or mechanical cutting only kills off the tops, application of Stantox T-45S completely destroys gorse, blackberry, lupin, briar, broom, etc.—without back-breaking labour. Now—in summer, when the scrub has fully leaved out—is the best time to spray.

Stantox
WEEDKILLERS

Please send me information on control of:
Gorse, Blackberry, etc. ....
Couch, Kikuyu, etc. ....
Spraying Equipment ....
Name ....
Address ....
....

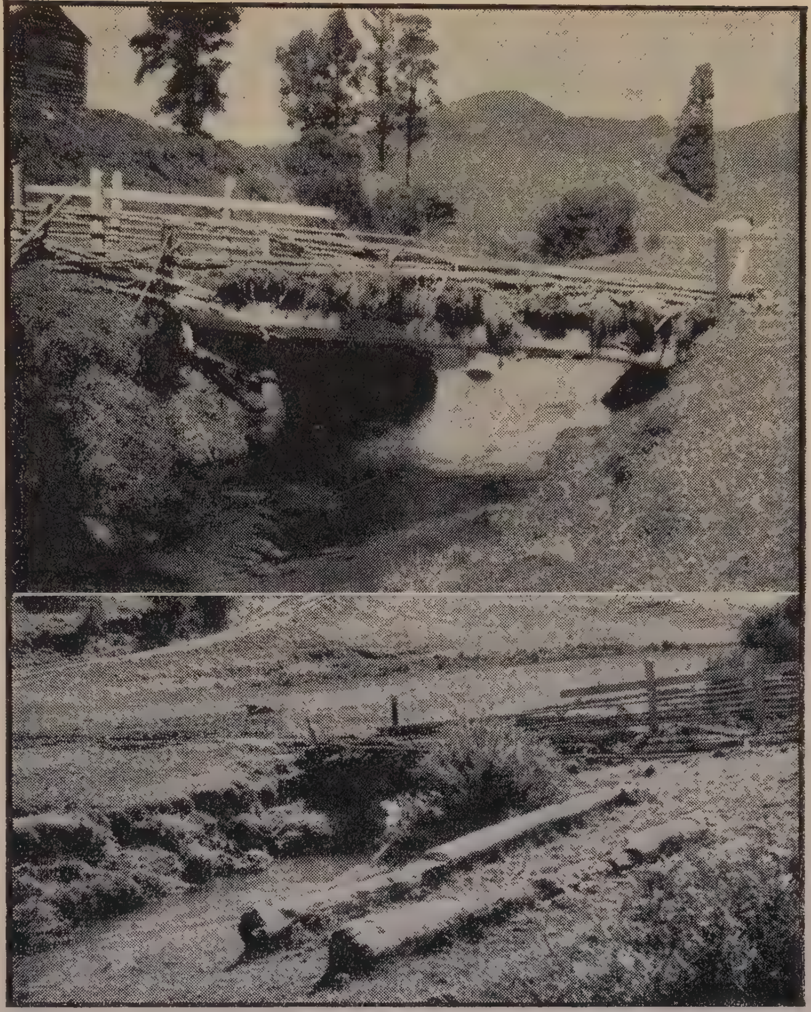
stantox TCA-90 destroys Couch or Kikuyu

A water-soluble weed-killer, Stantox TCA-90 will kill couch or kikuyu, or, used at reduced strength, act as a grass retardant. Has no long sterilising effect on the soil and no fire hazard.

POST THIS COUPON TODAY

Manufactured by J. H. BARBOUR & SON LTD.,
Paragon Chambers, Kelburn Avenue, Wellington.

had on the way out that morning crossed the bridge, which was about 15ft. long and 6ft. above the level of the creek. The bridge consisted of four white pine stringers each about 1ft. in diameter with a cross decking of pungas and a top layer of dirt and metal. The stringers had rotted to a large extent. On the return trip a truck preceded him over the bridge, which seemed all right. However, when the tractor—a rubber-tyred model weighing over 2 tons—drove on to the bridge the two right-hand stringers broke in the centre and one side collapsed, causing the tractor to fall into the creek below and the driver was pinned under it. The truck driver saw the accident, jumped into the creek, but was unable to release the tractor driver. He had two boys with him and sent one for a doctor and the other for a tracklaying tractor that was working 1½ miles away. When this machine arrived ½ hour later the driver was released, but he did not respond to artificial respiration, even though the doctor worked for about 3½ hours.



When a tractor was crossing a farm bridge two stringers on one side of the bridge collapsed and the tractor rolled into the stream below, pinning and drowning the driver in about 4ft. of water. The upper illustration shows the bridge that was built to replace the original one, which was of the same type of construction. The lower illustration shows two of the stringers of the original bridge and their state of decay. (The photograph was taken 10 months after the collapse of the bridge.) The original bridge consisted principally of four kahikatea stringers approximately 12in. in diameter and 15ft. long which had rotted to a considerable extent and a cross-decking of pungas overlaid with soil and gravel to even out the surface. This type of bridge is definitely unsafe, because the stringers are not strong enough and are very subject to decay. The top layer of soil, etc., loads the bridge dangerously and unnecessarily even before it has to take the weight of a vehicle.

23. With a rubber-tyred tractor and trailer mower a driver was cutting thistles in a flat field when an oilskin overcoat he was wearing became caught in the power take-off shaft of the mower. He was pulled down off the seat and entangled in such a way that death resulted from a broken neck. He had been operating the mower without a shield over the power take-off shaft, even though shields are provided by the manufacturer for just this purpose. It was established that a shield had been supplied with this mower. After the accident the tractor was found to be in third gear with the power take-off engaged, ignition on, and throttle half open, but the motor was stalled owing to clothing being tightly wrapped round the shaft. On this particular tractor the power take-off shaft is about 9in. below the driver's seat, which swivels 90 degrees either way, so that it would be quite easy for loose clothing such as an oilskin to become entangled on the shaft if the shield provided was not in position.

24. An elderly driver who had been operating his tractor for several years had been in the habit of sweeping silage to the pit with a front-mounted sweep while his two sons remained in the pit to spread the material. On the occasion on which he was killed the sons saw the load approaching as usual, but the tractor did not slow down; it appeared to speed up within a few yards of the pit edge. Both sons jumped clear of the approaching sweep and tractor as they came over the edge. The driver was thrown forward into the pit as the front of the tractor went down and rolled a short distance on the silage, but the tractor came right over to land upside down with the fender and rear wheel on top of the driver. The pit was 5 to 6ft. deep at the time of the accident. The sweep was in good order before the accident and an examination of the tractor revealed no defect responsible for the accident. There was no evidence of any skidding of the wheels, because the tread of the tyres was clearly seen in the soft surface right up to the edge of the pit. The tractor and sweep went right over the edge without any sign of an attempt to stop. The driver was wearing a raincoat and gumboots and at the time of the accident his foot may have slipped off the clutch or he may have had a blackout or heart attack at the critical moment.

25. A tractor driver and another farmhand were instructed to repair a fence about 1½ miles from the homestead and were told to use the tractor for transport to and from the job, but on the flat land only. Instead of keeping to the flat land the driver for some unknown reason took the tractor up a grade of approximately 11 degrees for ½ mile, the grade rising to 18 degrees for the last 20yds. to the top of the ridge, where there was a flat sufficient for safe turning. The tractor was left at this point after safely negotiating the outward trip. At lunch time the driver returned to the tractor and it appears that instead of returning by the same route he deliberately drove straight down a steep face of the ridge. The grades on this face were approximately 22 degrees for the first 300yds., with short stretches of steeper grade, the final

10—DETAILS OF TRACTOR FATALITIES . . .

How 25 Tractor Fatalities Occurred in 1952

	Cause of accident	Type of operation	Type of country
4 track-layers	2 rolled over	Giant discing	Steep hillside
		Bulldozing	Steep hillside
	2 unseated driver	Returning home	Steep hilltrack
		Unloading	Roadside
21 wheeled tractors	1 somersaulted	Silage making	Silage pit
	11 rolled over	Mowing	Steep bank
		Baling	Not unsafe
		Topdressing	Moderately steep
		Topdressing	Moderately steep
		Rolling	Moderately steep
		Topdressing	Steep hillside
		Topdressing	Steep hillside
		Returning home	Very steep hillside
		Returning home	Bridge collapsed
		Returning home	Flat field, bordered by creek bank
		Ploughing	Flat field, bordered by creek bank
	2 unprotected power take-off shafts	Mowing	Flat field
		Mowing	Flat field*
	4 fell off tractor	Rolling	Flat field*
		Trailer work	Slight slope*
		Mowing	Flat field*
		Baling	Flat field*
	1 pinned under	Overhauling	Flat yard*
	1 drove into drain	Trailer work	Flat farm road
	1 caught in draw-bar	Levelling	Flat field

* Child killed by tractor.

How Tractor Fatalities Occurred in Other Years

1951: 12 deaths

4 track-layers	1 somersaulted	Driving home empty	Very steep gully
	3 rolled over	Logging in bush	Slippery pinch in logging track
		Giant discing	Steep hillside
		Ploughing	40ft. bank into stream
8 wheeled tractors	1 somersaulted	Ploughing	Steep hillside
	5 rolled over	Driving on road	Steep bank into stream
		Trailer work	Moderate hillside
		Cartage work	Shingle pit
		Trailer work	Moderate hillside track
		Sweeping silage	Silage pit
	2 ran over drivers	Driving empty	Flat country
		Trailer work	Hill-country track

1950: 18 deaths

8 track-layers	1 driver unseated	Giant discing scrub	Steep hillside
	4 somersaulted	Bulldozing farm road	Steep hillside
		Bulldozing farm road	Steep hillside
		Trying out tractor	Steep hillside
		Topdressing	Fairly steep
	3 rolled over	Logging in bush	Steep hillside
		Giant discing scrub	Steep hillside
		Giant discing scrub	Steep hillside
10 wheeled tractors	1 somersaulted	Topdressing	Very steep
	6 rolled over	Rabbit ploughing	Fairly steep
		Topdressing	Fairly steep
		Topdressing	Moderately steep
		Topdressing	Flat field bordered by creek bank
		Discing	Hillside not considered unsafe
		Discing	Steep hillside
	3 miscellaneous	Backed over man	Flattish roadside
		Drove over bank	Flat field bordered by gully
		Ran over chock	Moderately steep

1949: 8 deaths

8 wheeled tractors	7 rolled over	Discing	Steep hillside
		Giant discing	Moderately steep
		Discing	Steep sidling
		Mowing	Bank
		Tedding	Moderately steep
		Mowing hay	Steep hillside
		Discing	Very steep hills
	1 pinned under	Repairing tractor	Gentle slope

portion being approximately 33 degrees for about 45yds. This face had a rough tussock covering and a stony, benched surface. The rubber-tyred tractor had grippers fitted, but they were in the up position. The driver soon lost control of his machine on its descent of the steep face and its path was marked by skid marks most of the way down. The driver was found dead on the flat at the bottom of the face and the machine, which overturned several times and lay about the flat in several pieces, was almost completely wrecked.

The tables at left constitute the data for the article "Analysis of 63 Tractor Fatalities" which will appear in next month's "Journal".

New Book on Artificial Respiration

IN view of the number of deaths by drowning the Department of Health is to be commended on the publication of "Artificial Respiration". With the aid of excellent photographic illustrations and diagrams the author, T. O. Garland, concisely describes the various methods which have been favoured at different periods.

Especially interesting is the description of the intensive experiments conducted with various methods in the United States in recent years. The last paragraph in this section is emphatic:—

"The evidence is overwhelming that the Holger Nielsen is a better method than that of Schafer, and it is therefore recommended that all people learning artificial respiration should be taught the Holger Nielsen method as well as Schafer, until enough people in the country know it to enable the Schafer method to be dropped altogether. . . ."

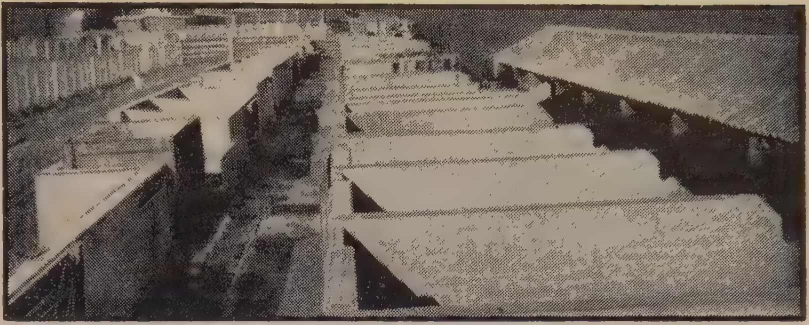
The book is well printed on art paper which enables the illustrations to be reproduced to full advantage. It can be bought for 3s. 6d. per copy from the Government Printer or any bookseller, but not from the Department of Health.

Making Silage

With the great improvement in recent years in machinery for the handling of silage the area cut for the making of this fodder is increasing. However, the introduction of the buckrake, front-end loader, and forage harvester has meant that methods have had to be modified to enable these machines to be used to best advantage. Suitable methods are discussed in the new Department of Agriculture Bulletin No. 313, "Silage", which is now available free from offices of the Department. The bulletin deals with all aspects of silage making, including stacking by the common sweeping and grab stacker method, and assesses the merits of various types of machinery and of different ways of conserving the green material.

Foot-rot and Necrotic Ulcer Diseases in Pigs

THE discovery in 1950 that in New Zealand the organisms causing foot-rot in pigs were the same as those causing necrotic ulcers, necrotic jaws, and schirrous cord after castration was a major step forward in the study of foot-rot. Until 1951 most reports of the incidence of foot-rot came from Northland, and an analysis of the position suggested concrete as a predisposing factor. It was felt that a survey throughout the country of the position in piggeries with concrete floors should be undertaken. This article by E. D. Edwards, Technical Officer, Animal Industry Division, Department of Agriculture, Wellington, deals with the survey, summarises the present knowledge of the subject, and gives advice on treatment and prevention of these diseases.



Surveys show that the incidence of foot-rot in pigs tends to be higher in concrete piggeries. However, the advantages of convenience and permanence generally justify the use of concrete in piggery construction.

THE aim of the survey was the collection of data from all concrete piggeries in each district, so that the selection of farms would not be biased in any way. It was felt that at least 200 properties should be included from each district to give reasonable numbers for analysis. District Pig Councils agreed to co-operate in collecting field data.

Unfortunately this aim was not achieved, as the number of farms reported on was inadequate in all districts but Northland. Further, there was apparent a tendency for some District Pig Council supervisors to report only on farms where cases of foot-rot had occurred, thus omitting concrete-floored piggeries where there was no history of the disease.

Returns were received from the various districts as follows:—

District	Farms affected with foot-rot	Farms not affected with foot-rot
Northland	104	48
Waikato	27	—
Taranaki	22	—
Bay of Plenty	4	1
West coast (South Island)	12	5
Otago and Southland ..	6	25
Total	175	79

Though the number of returns available for analysis is insufficient to give a true picture for the Dominion as a whole, this may indicate that the incidence of foot-rot in pigs is serious only in the Northland district. This might indicate a connection between temperature and incidence of the disease. It is doubtful if there is any direct relationship, however, as though foot-rot and necrotic sores have occurred throughout the country, the proportion of cases in which they occur on the same farm is not as high in Northland as it is in Waikato and Taranaki. Injuries to the feet or wear on them caused by concrete floors may be a factor producing higher incidence of foot-rot in Northland.

The effects of various factors in housing and management on the incidence of foot-rot, as found in this survey, are discussed in the sections which follow.

Floors

Foot-rot occurred more frequently in pigs provided with concrete sleeping floors than in those having wooden sleeping floors. This may be caused by the more abrasive surface of concrete, especially when new.

For analysis the slope of floors was divided into three sections:—

(a) Slight or no slope, having a fall of up to ¼in. per foot;

(b) medium slope, having a fall of ¼in. to ¾in. per foot;

(c) steep slope, having a fall of over ¾in. per foot.

Most of the floors had a medium fall. Though the slope of the floor alone did not appear to be a significant factor in the incidence of foot-rot, one would expect that if the floor was dirty, moist, and slippery, wear on the hoof would increase with the increase in the slope of the floor.

Floors without fall tend to be damp, however, and slope sufficient to provide for quick drainage and drying off of the wash water is necessary. A fall of ½in. to the foot should be satisfactory.

The texture of the floor surface was classified as smooth, medium, and rough. Foot-rot appeared to increase as the floor surface increased in roughness and was generally at a higher level on all-concrete floors than on wooden floors.

Over the whole survey foot-rot in pigs on damp floors was almost double that in pigs on dry floors. Where both the sleeping floor and feeding area were of concrete there was a 15 per cent. incidence of foot-rot on those classified as dry compared with a 17 per cent. incidence on those classified as damp, but in piggeries having wooden sleeping floors there was a much higher incidence, 23 per cent., on damp floors than that on dry floors, 11 per cent. The only negligible incidence of foot-rot, 1.8 per cent., was where pigs were kept continuously in houses with wooden sleeping floors and where the floors generally were kept dry.

Frequency of Cleaning

The effect of cleaning out the unit and the dunging passage not less frequently than every second day and less frequently than every second day was examined. Most farmers in this survey cleaned both parts of the house at the same time, so that the analysis served as a check on the effect of cleaning at intervals of not more than 2 days compared with less frequent cleaning. The effect of cleaning with and without running water was also analysed.

On all-concrete floors frequency of cleaning does not appear to be an important factor in the occurrence of foot-rot. However, irrespective of the frequency of cleaning, where running water was used the incidence of foot-rot was greatly increased.

In piggeries with wooden sleeping floors cleaning at intervals of not more than 2 days resulted in much less infection than when cleaning was less frequent. The use of running water on such floors was associated with only a slight increase in foot-rot.

It appears that as little water as possible should be used for cleaning, and that where running water is available care is necessary to ensure that it is not so misused that floors are left damp for considerable periods, as a result of which they may become slippery and unhygienic. As long as there is a good fall and even surface to permit quick drainage there should be no disadvantage in using liberal quantities of water.

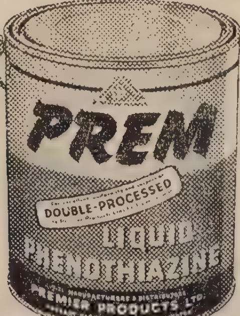
Time on Concrete

A further factor in the study of concrete as a predisposing cause of foot-rot is the effect of various management practices, particularly the period pigs are kept on concrete floors from time of birth to disposal.

It was found in this survey that infection was highest, about 19 per cent., in those pigs which were allowed to run "on and off" concrete. Where pigs are kept on concrete throughout and where they are not confined to concrete until a month or so before marketing, infection is much lower. The explanation may be that the pigs' feet are worn and injuries develop on the concrete, and, though the germs responsible may gain entry to the damaged hoof from the concrete, infection is more likely when such pigs are allowed out in what may often be muddy conditions.

Type of Feed

The effect of feeding skimmed milk, whey, buttermilk, and offal and garbage from time of weaning to bacon



EASY RUNNING PREM

LIQUID PHENOTHIAZINE

It's ready for use after a preliminary shake.

Our unique manufacturing method ensures a high efficiency, easy running drench that needs no stirring and won't clog instruments. Walk into any stockists and ask them to remove the lid from a gallon tin of PREM . . . any tin. See for yourself how PREM is perfectly mixed in a smooth, even suspension with no sign of settling out.

TRANSPORT-TESTED

Shuttled back and forth by rail for 2,400 miles, PREM liquid phenothiazine shows no sign of settling out.

VIBRATION-TESTED

Continuously shaken for 20 hours on a table vibrating 23 times a second, PREM stays in perfect suspension . . . and still runs freely.

LABORATORY-TESTED

Every batch of PREM must pass rigid laboratory tests for particle size and viscosity before release.

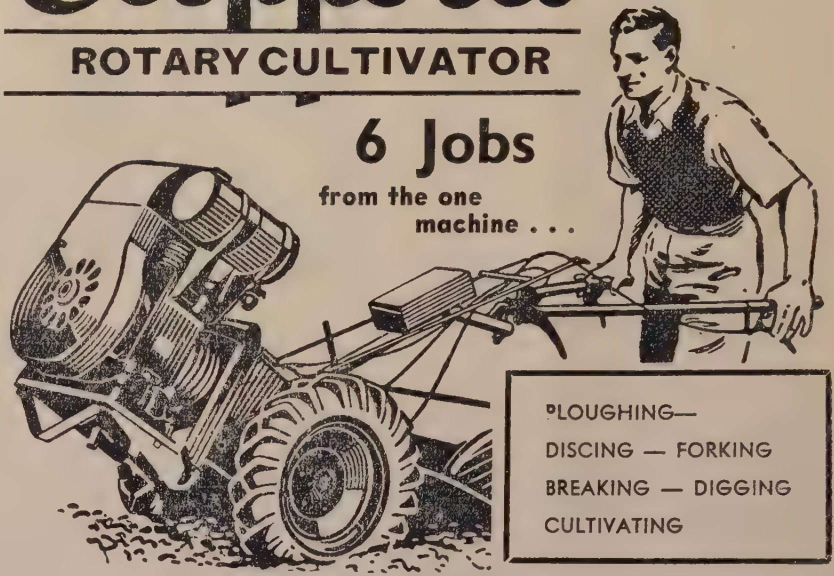
N.Z. Manufacturers & Distributors

PREMIER PRODUCTS LIMITED,
Wellington

Clifford

Britain's Leading

ROTARY CULTIVATOR



6 Jobs

from the one machine . . .

PLOUGHING—
DISCING — FORKING
BREAKING — DIGGING
CULTIVATING

FULLEST INFORMATION FROM YOUR NEAREST DEALERS . . .

Authorised "Clifford" Distributors:

Auckland: Broadway Motors Ltd **Dargaville:** Gordon Bell. **Whangarei:** Whangarei Motors. **Tauranga:** G. E. Clark & Sons Ltd. **New Plymouth:** R. J. Burkitt. **Stratford:** Sayers Bros. **Wanganui:** Linwood Motors Ltd. **Hastings, Napier, Palmerston North:** Agnew Refrigeration Ltd. **Wellington:** Wright Stephenson & Co Ltd **Nelson:** N. W. Gill. **Motueka:** Farm Services (Motueka) Ltd **Christchurch:** Mason Struthers & Co. Ltd. **Dunedin:** Reillys Central Parking Station. **Invercargill, Gore:** Gormack, Wilkes, Davidson Ltd.

NOW RELEASED FOR GENERAL DISTRIBUTION!

- INCREASES GROWTH RATE.
- GIVES GREATER WEIGHT GAIN FOR EVERY POUND OF FOOD CONSUMED.

Vetspen Ration

- TURNS RUNTS AND CULLS INTO "GOOD DOERS"
- REDUCES MORTALITY RATE.
- IMPROVES BLOOM, APPETITE AND GENERAL CONDITION.

THE GLAXO PENICILLIN FEED SUPPLEMENT

FOR PIGS, YOUNG CALVES AND POULTRY

More than a year ago, following extensive overseas trials, Glaxo Laboratories made **VETSPEN RATION** available to the New Zealand market for limited distribution. Vetspen Ration has been subjected to convincing tests in the field in New Zealand. Its use during two seasons has amply justified the claims made for it.

VETSPEN RATION is made from British Penicillin and is subject to rigid laboratory control **in New Zealand.** An 8oz. tin contains sufficient for—

★ Two pigs from creep feeding to a live weight of 200lb.
★ One calf from artificial feeding to 16 weeks.
★ Sixty chicks from day old to 12 weeks.

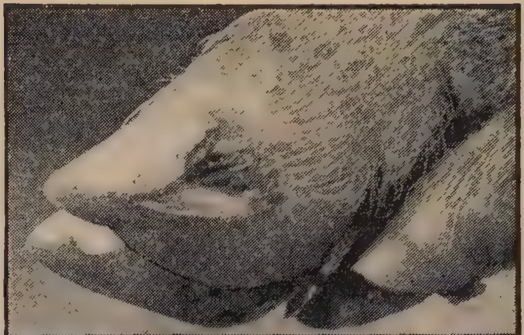
Available also in 10lb. tins for big users.

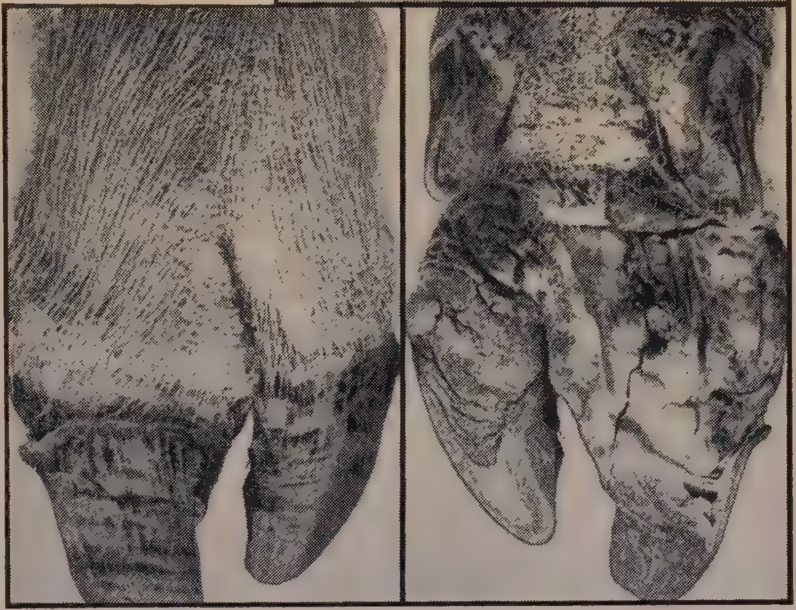
VETSPEN RATION—another Vetspen product by Britain's largest manufacturers of antibiotics, specially made for use on New Zealand farms. Supplies available throughout New Zealand.

Send for further information to:

GLAXO LABORATORIES (N.Z.) LTD.,
Palmerston North

weight was analysed, as was the effect of supplementing the dairy by-products with grain and/or meat meal, and offal and garbage with milk and/or whey.





At right—A crack in a hoof which has become infected with foot-rot, causing lameness. Below and lower right—Front and rear views of an infected foot, showing typical cracking of the hoof and swelling of the affected digit.

It is apparent that pigs fed on offal and garbage are less liable to get foot-rot than are those fed on dairy by-products, and this result accords with field observation. The one farm in the former feed group which reported foot-rot was one of five which fed milk with garbage. The highest incidence of foot-rot occurred in pigs having skimmed milk. When a meal supplement was used with skimmed milk a lower foot-rot incidence resulted. It is possible that pigs fed on skimmed milk have a diet deficient in hoof-forming materials and in nutrients necessary for their general well-being.

Responsible Organisms

As the same organisms are responsible for both foot-rot and necrotic sores, during the survey of foot-rot information on the occurrence of necrotic sores was also recorded. Of those farms affected by foot-rot 50 per cent. also reported necrotic sores, whereas of the farms unaffected by foot-rot only 5 per cent. were affected by necrotic sores. The presence of necrotic sores is usually an indication of faulty management such as allowing pigs to become injured by barbed wire, protruding nails, and other material in unhygienic surroundings. This faulty management would appear to have extended to the feeding practice adopted. Two-thirds of the farms reporting necrotic sores fed the pigs on skimmed milk only from weaning to marketing.

New Concrete as Pre-disposing Factor

The survey confirms earlier conclusions that concrete is a pre-disposing cause of foot-rot owing to its abrasive surface. New concrete is more abrasive than old concrete because of the protruding particles of sand and cement, which become worn down as the concrete ages. Until the concrete is thoroughly cured, there may also be some chemical action by the cement on the hoof which will reduce its strength, thus allowing the entry of organisms.

[*Dunstan*

A very advanced necrotic ulcer after 1 month's treatment with sulphanilamide powder. The ulcer was later completely cured.

Necrotic Ulcer Diseases

Foot-rot, necrotic ulcers, necrotic jaws, and schirrous cord are the necrotic ulcer group of diseases. The causal organisms and conditions necessary for infection are the same for each disease. Some injury to the foot or skin must occur to allow entry of the organisms.

Prevention

Selection of Stock

Care should be taken in the selection of breeding stock to cull those which have progeny with uneven digits. Pigs should stand squarely and evenly on all feet, as if there is a tendency for the weight to be taken more on one toe than the other, the resulting swivelling action will increase the risk of wear and injury.

Treatment of New Concrete

Injury or abrasion must be avoided. Abrasive flooring materials, protruding nails, wire, and rough stone tracks may be responsible. To prevent foot-rot new concrete floors, after being thoroughly cleaned, may be painted with a bituminous paint to reduce the wearing action of the new concrete. An alternative treatment would be to put a ¼in. layer of bitumin instead of plaster over the new concrete. The choice of method is left to the farmer, but one or other alternative should be used for new concrete floors. It is advisable to treat all the floor to which the pigs have access. Overcrowding in pens, leading to struggles for trough space, increases the chances of injury. Therefore ample trough space should

14—FOOT-ROT IN PIGS . . .

be allowed—at least 12in. per pig at baconer weight.

Clean Conditions

Clean, dry floors are desirable. Frequent use of a broom and shovel with no more water than is necessary to clean the floor should enable the floor to be kept as dry as possible; in addition to reducing the likelihood of foot-rot, this permits the house to be kept warmer and more hygienic.

If the incidence of foot-rot and necrotic ulcers is high and causes of injury cannot be eliminated, disinfection of piggeries is of little value in combating the diseases. It is probably best to shift the piggery to a new site and not allow the pigs in the old yards and buildings.

Schirrous cord can be prevented by strict cleanliness during and after castration, by making the cut sufficiently low to give proper drainage, and by applying to the wound a non-irritating disinfectant.

Balanced Feeding

Pigs fed on skimmed milk only appear to be more susceptible to the diseases than those on other diets. To correct any possible nutrient deficiency the use of meals to supplement and balance the skimmed milk is desirable.

Foot-bath Treatment

It has been shown at the Department of Agriculture's Ruakura Animal Research Station that if all pigs go regularly twice a week through a foot bath containing a 10 per cent. bluestone solution, the disease will be prevented. The pigs' feet should be clean and, if necessary, washed before the pigs enter the foot bath.

Copper naphthenate in kerosene as used in timber preservation has also been used successfully, and as it has greater penetration than the aqueous solution of bluestone (copper sulphate), it may be used with at least as much chance of success. Cures of lame pigs by this treatment have been reported, but once the pig has become lame veterinary treatment as indicated in a later paragraph is recommended.

General Management

Good management is the key to securing effective control over any disease, and foot-rot and associated diseases are no exception. They can be prevented by attention to piggery floors and yards, provision of an adequate diet, and cleanliness during castration. By the early recognition and treatment of affected pigs as recommended in this article it should be possible to reduce the incidence on any farm to a minimum and permit affected animals to recover quickly.

Veterinary Service

The most effective treatment of foot-rot, necrotic ulcers, and schirrous cords in pigs after castration is by injection of antibiotics under veterinary direction.

As most districts in New Zealand are now provided with veterinary services, farmers should apply to the local veterinarian for advice as soon as disease is apparent in their pigs.

Chemical Control of Pasture Pests

D.D.T. and B.H.C. correctly applied to pasture land have invariably proved effective against grass-grub and subterranean grass caterpillar. Failure to bring these pests under control after application of the insecticide has been shown to be due to failure to observe one or more of the recommendations for correct treatment.

Research workers of the Entomological Research Station of the Department of Scientific and Industrial Research, who were responsible in New Zealand for the development of the chemical treatment of soil to bring under control the ravages of the grass-grub and subterranean grass caterpillar, have made extensive investigations in those cases where the treatment has been reported as ineffective.

The most important reasons for failure are:—

Extremely careless mixing of the insecticide in the fertiliser.

The effective component of the insecticide has been missing.

The insecticide has been drilled in instead of being broadcast.

Application has been too late to save the pasture.

Where application has been made to wet pasture, grazing has been allowed before the insecticide is washed on to the ground.

The recommended dosage of 2lb. of D.D.T. or B.H.C. per acre must be uniformly distributed over the area, and where the insecticide is supplied in the fertiliser a guarantee should be sought to the effect that not only has the correct dosage been added in bulk to the superphosphate, but that it is evenly distributed in the mix. Analyses of some mixes commercially supplied have shown a wide variation of the amount of the insecticide in bags, ranging from ten times the correct amount in some samples to only a twelfth of the dosage in others. Other fertiliser works have supplied excellent mixes.

Grub control requires all the insecticide on the soil and not on the pasture. Drilling in with the seed is not a safe practice (though some farmers have reported success with this method) because grubs may work up to the surface between the drills and later destroy the plants above the insecticide; furthermore when B.H.C. is used it can adversely affect the growth of certain plants.

Where the grub population is heavy a week's delay in application can result in almost complete loss of pasture under certain climatic conditions. Finely ground insecticides of a wettable type have a distinct advantage in heavy grub population areas, as they give up to 2 weeks' quicker action. The fertiliser must reach the soil surface, and low or moderate spray applications (under 300 gallons per acre) may not be sufficient on established pastures to wash the fertiliser off the plants. Moreover in some seasons or districts it is virtually impossible to get really dry pasture when insecticides should be applied for grub control; it is therefore important to keep stock off treated areas until rain washes the insecticide off the pasture.

Destroying Caterpillars after Floods

TWENTY inches of rain falling in February 1952 caused widespread flooding in North Auckland, particularly in the Tanekaha district bounding the Wairoa River and in the Wellsford district. Large areas were inundated for 1 to 3 weeks. Where flooding went on for 3 weeks all vegetation was killed except docks and buttercups, but on areas flooded for only about a week *Paspalum dilatatum* and *Lotus major* survived. As after previous floods an infestation of caterpillars appeared 4 to 6 weeks after the flooding and where the caterpillars were uncontrolled they completely stripped pastures in the areas which had been flooded and even rushes were consumed.

Trials with D.D.T. incorporated in baits and D.D.T. and B.H.C. incorporated with fertiliser and applied in the dry form were laid down. Both the dusts and the baits were successful. Trials with dusts showed successful control of the caterpillars 36 hours after application of ½lb. of 100 per cent. D.D.T. per acre mixed with finely ground phosphatic fertiliser. Slightly less than ¼lb. of 100 per cent. B.H.C. gave almost as good results. A bait of 1/10lb. of D.D.T. mixed with 25lb. of poultry mash and 4lb. of molasses gave good control. With the aim of reducing the cost of the baits, sawdust was tried out in place of the poultry mash, and good control was obtained with 50lb. of sawdust, 10lb. of molasses, and 1/10lb. of D.D.T. per acre. Farmers were quickly informed of the methods of control and these were used by some with good results. Future infestations of caterpillars after floodings should be controlled promptly now that reasonably cheap methods of destroying the caterpillars have been pointed out to farmers.

—*C. E. BALLINGER, Instructor in Agriculture, Department of Agriculture, Whangarei, and C. M. BLICK, Fields Instructor, Department of Agriculture, Warkworth*

Free Bulletins on Farm Management

Nos.

219 Home-made Cooler.
255 The Farm Tractor.
256 Liquid Manure.
265 Erecting a Seven-wire Fence.
271 Farm Shelter.
286 Farm Drainage.
307 Tractor Inter-row Cultivators.
322 Disposal of Sewage from Farm Homesteads.
344 Farm Water Supplies.
345 Concrete.
346 Homestead Shelter Planting.
353 Design and Construction of Sheep-drafting Yards.

The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

Infertility in Cattle and Sheep

By J. F. FILMER, Director, Animal Research Division, Department of Agriculture, Wellington

THE economic production of milk and meat in New Zealand is dependent on the fertility of cows and ewes. It is therefore not surprising that farmers should be worried when sterility and abortions interfere with the normal calving and lambing of their herds and flocks. Planning of control of infertility is dependent mainly on correct diagnosis, and improvement can be brought about only if farmers realise the importance of prompt veterinary examination.

BEFORE the problem of infertility is considered it is necessary to have a true appreciation of the normal reproductive behaviour of cows and ewes in New Zealand.

Dairy Cows

Fortunately the Dairy Board has collected copious data for dairy cows. From these emerge the following facts which represent the average performance in New Zealand dairy herds:—

About 62 per cent. of cows hold to the first service.

At the end of the mating season about 7 to 8 per cent. of cows remain empty.

Of these some 80 per cent. conceive normally in the next season if they are retained in the herds. Of a group of cows culled for sterility 23 per cent. were in calf.

Between 1 and 2 per cent. of dairy cows abort each year.

About half of these abortions are due to contagious abortion.

Before the advent of Strain 19 vaccine about 5 per cent. of all dairy cows aborted each year.

There are of course many herds in which in some years more than 62 per cent. of cows hold to the first service and less than 7 per cent. of cows remain empty. But there are probably few herds in which the breeding performance is consistently higher than the Dominion average.

The restricted mating season in New Zealand makes it unlikely that it will be possible to reduce the average number of empty cows materially. The conception rates are at least as high as those obtaining in other dairying countries. A veterinary examination of cows for pregnancy before culling would prevent cows which are in calf from being culled for sterility, of which acceptance of the bull is not a certain criterion. The universal vaccination of calves with Strain 19 vaccine would further reduce the incidence of abortion.

It may be accepted that on a Dominion-wide basis the fertility of dairy cows is at least as high as that of any other dairy country, and it is unlikely that it can be materially improved. This, however, is small consolation for the dairy farmer who at the end of a particular season has a large proportion of his cows empty or who experiences an abortion storm in his herd.

Such occurrences are not just chance happenings, and if the cause of the trouble can be established, corrective measures can often be devised.

Correct diagnosis usually depends on accurate breeding records, prompt veterinary examination, and laboratory assistance.

The importance of accurate breeding records cannot be over-emphasised. These should include dates of all services and the names of the bulls used; calving dates; details of assistance given at calving; notes on retained after-birth, discharges, or other abnormalities; dates of abortions; dates of drying off; records of any illness. Such records are of the greatest possible assistance in diagnosing the cause of sterility or abortion. Without them it is often difficult or even impossible to make a correct diagnosis.

The next step is the prompt enlistment of veterinary aid. A sterility problem frequently does not become apparent until near the end of the mating season. Because it is then too late to do anything in that season, dairy farmers tend to neglect seeking veterinary advice in the hope that the position will improve next year. Such a policy makes diagnosis difficult and treatment impossible.

There are four different infections which are known to cause bovine abortion or sterility in New Zealand. These are contagious abortion, trichomoniasis, vibriosis, and leptospirosis. The diagnosis of each of these depends either on finding the organism in discharges, membranes, or foetus or on laboratory tests made on blood or vaginal mucus. To ensure a reasonable chance of success specimens must be collected at the right time, usually just after abortion, calving, or service.

Not only does correct diagnosis depend on prompt veterinary examination, but this is equally essential for the planning of effective control measures. These usually involve periods of sexual rest for cows and the culling or treatment of infected bulls. Such measures can be undertaken only well in advance of the next breeding season.

Run Cattle

The diagnosis of infertility and abortion in run cattle obviously presents special difficulties. However, where abortions occur or calving percentage is unusually low, veterinary assistance should be sought.

Contagious abortion is much more prevalent in run cattle than is frequently realised. It can be easily diagnosed by a blood test, and Strain 19 vaccine has proved very effective in reducing abortions and increasing calving percentages in infected herds.

Sheep

Accurate fertility data are unfortunately not available for sheep. The excellent work of the Gisborne Veterinary Club has focused attention on the large incidence of infertility in rams. Most veterinarians are now familiar with the manual examination technique, and large numbers of rams are examined for fertility annually.

Investigations at Wallaceville have shown that the commonest cause of infertility in rams is an infectious disease related to contagious abortion in cows. Unfortunately manual examination will not always detect infection. It will, however, eliminate rams which are obviously diseased and likely to sire very few lambs.

The Wallaceville investigations indicate that it may be possible to provide a blood test for this disease, and preliminary experiments with vaccines are giving promising results.

The Gisborne Veterinary Club investigations have also drawn attention to the high death-rate in very young lambs. It is suggested that from 10 to 20 per cent. of all lambs in New Zealand are either born dead or die in the first week. Investigations in New Zealand and overseas have clearly shown that these losses are due to a wide variety of causes which include weather, accidents, faulty nutrition of the ewe, difficult lambing, infections, and faulty udders. It is not yet clear to what extent these losses can be reduced, though better shepherding, antiseptic precautions when assisting with lambing, culling for faulty udders, and vaccination against blood poisoning would undoubtedly help. Occasionally very large losses occur through abortions or deaths at or near lambing. In such cases veterinary advice should always be sought promptly.

Some disappointment may be felt because this article does not give detailed instructions for the prevention and treatment of sterility. This is not possible, because prevention and treatment depend on correct diagnosis, which can be secured only if farmers enlist prompt veterinary examination.

Control of Infertility

1. Infertility and abortion in cows are due to a number of causes, including at least four different infections.

2. Accurate breeding records are of the greatest importance in diagnosing the cause of infertility or abortion.

3. The prompt enlistment of veterinary aid is essential for both correct diagnosis and effective treatment.

4. Abortion and low calving percentages in run cattle may be due to contagious abortion. This can be easily diagnosed and losses can be reduced to a minimum by the use of Strain 19 vaccine.

5. Veterinary examination of rams will eliminate those obviously diseased, but will not detect all infected rams.

I'm protecting profits by using the ELASTRATOR method—

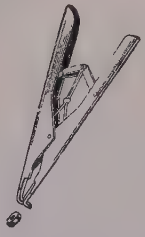
Castrate Calves, Lambs without setback — use

ELASTRATOR

and the Rubber Ring.

Calves on the bucket or on the dam castrated with the Elastrator Rubber Ring go ahead without setback. The younger the better. Safe, bloodless, simple and effective. Widely acclaimed by American and Australasian cattlemen.

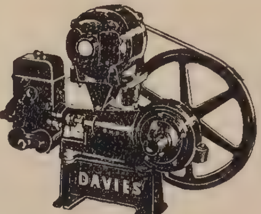
Sheep too! The ELASTRATOR is made to order for dairy farmers who run small flocks. Simply carry the ELASTRATOR and rings in your pocket, apply rings to new born lambs—the castration is easy, bloodless and effective.



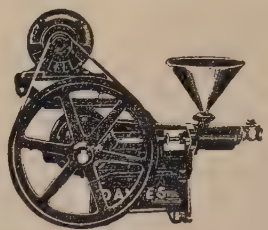
ELASTRATOR CO. LTD.

P.O. BOX 226 - BLENHEIM.

DAVIES make the pumps to suit the purpose!

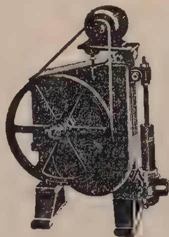


"DAVIES 250"
—250 GPH, with 150′ head; and 190 GPH 300′ head. Engine or electric. Also as 15, 17, or 90 Gal. pressure outfits.

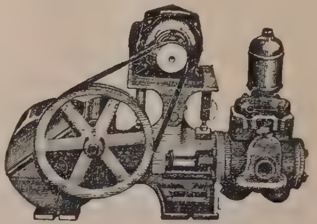


"DAVIES 109"
—Self oiling Deep Well Power Unit for Wells deeper than 25′. Also 47 or 90 Gal. automatic pressure outfit or open tank service. Max. depth 300′.

"DAVIES 101"
—Self oiling Skim Milk Pump. No. 1 120 GPH. No. 2 200 GPH. Elec. or Engine drive.



"DAVIES 500′
—Self oiling geared power pump, double acting, 500 or 750 GPH up to 100 lbs. pressure or 230′ head. Also a high pressure pump, 290 GPH head 400′.

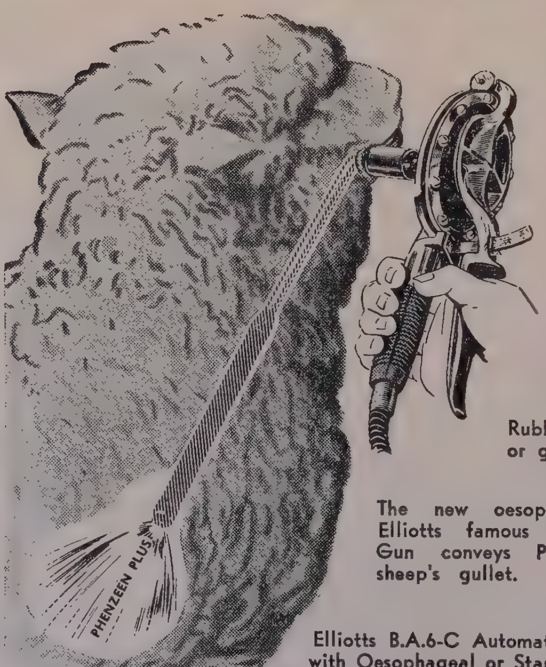


D. H. DAVIES & CO. LTD.

404 Broadway, Newmarket, Auckland. Phone 22-458 Business. 87-261 after hours.
MANUFACTURERS OF MILK PUMPS, DEEP WELL GEARINGS, PRESSURE OUTFITS

Elliotts PHENZEEN PLUS DRENCH TECHNIQUE

with the NEW B.A.6-C GULLET TUBE



Nothing mechanical to go wrong.

Bite proof metal tube in mouth.

Flexible rubber extension slips down gullet naturally in one easy action.

Rubber tube cannot injure throat or gullet.

The new oesophageal (gullet) tube with Elliotts famous B.A.6-C Automatic Drench-Gun conveys PHENZEEN PLUS direct to sheep's gullet.

Elliotts B.A.6-C Automatic Drenching Gun. Complete with Oesophageal or Standard Nozzle - - £11/5/-
Oesophageal Tube separately - - - 25/6

FROM ALL STOCK & STATION AGENTS
Marketed by Elliotts N.Z. Company, Ellco Ltd., Onehunga, Auckland.

Lambing Estimates for 1953 Highest Recorded

The estimated lambing percentage and number of breeding ewes in the Dominion for 1953 are the highest on record. The lambing percentage of 97.27 is .79 per cent. higher than the previous record in 1949, and the number of breeding ewes is 818,030 higher than that for last year. Totals for counties, districts, and the Dominion are set out in the following tables, which have been contributed by the Animal Industry Division.

NORTH AUCKLAND LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Mangonui	30,220	84.4	25,505
Whangaroa ..	14,196	80.4	11,413
Hokianga	43,494	87.8	38,187
Bay of Islands ..	70,373	90.4	63,617
Whangarei ..	90,966	90.6	82,415
Hobson	84,636	89.8	76,003
Otamatea	96,081	95.1	91,373
Rodney	111,423	86.0	95,823
Waitemata ..	94,378	90.9	85,789
Eden	1,361	100.0	1,361
Great Barrier Island	4,355	61.0	2,656
Manukau	82,075	89.7	73,621
Franklin	161,182	96.1	154,895
Totals	884,740	90.72	802,658

AUCKLAND LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Raglan	518,839	92.7	480,963
Waikato	191,410	98.9	189,304
Waipa	217,772	99.1	215,812
Otorohanga ..	184,193	100.8	185,666
Kawhia	80,014	91.4	73,132
Waitomo	419,971	91.9	385,953
Taumarunui ..	130,754	100.1	130,884
Coromandel ..	31,691	83.2	26,366
Thames	14,923	91.5	13,654
Hauraki Plains ..	27,057	96.4	26,082
Ohinemuri ..	31,587	94.1	29,723
Piako	151,325	100.2	151,627
Matamata ..	343,646	103.6	356,017
Tauranga	174,438	96.8	168,855
Rotorua	159,550	91.2	145,509
Taupo	18,095	85.0	15,380
Whakatane ..	55,413	89.6	49,650
Totals	2,750,678	96.14	2,644,577

GISBORNE LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Opotiki	51,034	79.5	40,572
Matakaoa	57,420	82.0	47,084
Waiapu	232,375	87.0	202,166
Uawa	115,523	90.0	103,970
Waikohu	334,420	89.0	297,633
Cook	434,892	92.0	400,100
Totals	1,225,664	89.05	1,091,525

HAWKES BAY LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Wairoa	401,159	88.2	353,822
Hawkes Bay ..	978,462	98.3	961,828
Waipawa	442,312	106.2	469,735
Waipukurau ..	166,977	106.4	177,663
Patangata	514,761	98.8	508,583
Dannevirke ..	316,650	101.8	322,349
Woodville	86,703	102.9	89,217
Weber	54,931	89.5	49,163
Totals	2,961,955	99.00	2,932,360

TARANAKI LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Ohura	133,986	110.3	147,786
Whangamomona ..	57,970	88.2	51,129
Clifton	95,984	91.1	87,441
Taranaki	32,370	100.1	32,402
Inglewood	64,287	98.8	63,515
Egmont	29,298	106.3	31,143
Stratford	119,381	95.6	114,128
Eltham	60,291	105.9	63,848
Waimate West ..	9,565	105.3	10,071
Hawera	89,159	99.0	88,267
Totals	692,291	99.19	686,730

WELLINGTON LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Patea	226,771	100.0	226,771
Kaitieke	75,920	100.6	76,375
Waimarino ..	170,355	94.7	161,326
Waitotara	150,014	96.6	144,913
Wanganui	298,628	92.6	276,529
Rangitikei	1,019,861	99.0	1,009,662
Kiwitea	258,401	99.7	257,625
Pohangina	133,616	97.6	130,409
Oroua	238,811	110.3	263,408
Manawatu	160,930	104.9	168,815
Kairanga	105,997	104.3	110,554
Horowhenua ..	125,532	99.8	125,280
Hutt	68,370	87.8	60,028
Makara	45,622	90.5	41,287
Pahiatua	174,567	98.7	172,297
Akitio	157,235	89.3	140,410
Castlepoint ..	93,954	92.7	87,095
Eketahuna ..	144,121	89.3	128,700
Mauriceville ..	47,877	93.1	44,573
Masterton	306,501	83.5	255,928
Wairarapa South .	181,375	96.5	175,026
Featherston ..	351,326	100.4	352,731
Chatham Islands .	46,567	75.0	34,925
Totals	4,582,351	97.06	4,447,667

MARLBOROUGH LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Sounds	90,738	74.0	67,146
Marlborough ..	227,727	90.0	204,954
Awatere	177,710	92.0	163,493
Kaikoura	121,569	85.0	103,333
Totals	617,744	87.20	538,926

NELSON LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Waimea	165,932	88.8	147,347
Takaka	26,206	87.0	22,799
Collingwood ..	13,194	85.0	11,214
Buller	1,580	86.8	1,371
Murchison ..	30,660	98.5	30,200
Inangahua	16,813	96.6	16,241
Totals	254,385	90.0	229,172

WESTLAND LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Grey	27,272	107.0	29,181
Westland	36,062	102.5	36,963
Totals	63,334	104.40	66,144

CANTERBURY LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Amuri	235,330	84.9	199,795
Cheviot	160,085	91.5	146,477
Waipara	313,220	101.3	317,291
Kowai	90,564	102.0	92,375
Ashley	64,363	97.9	63,011
Rangiora	56,372	110.3	62,178
Eyre	65,258	105.0	68,520
Oxford	82,992	93.9	77,929
Tawera	47,388	76.3	36,157
Malvern	157,148	102.6	161,233
Paparua	48,717	109.5	53,345
Waimairi	2,818	97.6	2,750
Heathcote	7,366	98.1	7,226
Halswell	15,116	96.0	14,511
Mount Herbert	39,939	101.0	40,338
Akaroa	85,383	108.0	92,213
Wairewa	68,003	100.0	68,003
Springs	36,507	108.0	39,427
Ellesmere	93,444	113.0	105,591
Selwyn	161,562	74.5	120,363
Ashburton	942,115	94.5	890,298
Geraldine	297,078	97.8	290,542
Levels	226,146	110.3	249,439
Mackenzie	305,943	88.3	270,147
Waimate	538,178	92.2	496,200
Totals	4,141,035	95.76	3,965,359

OTAGO LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Waitaki	446,448	100.0	446,448
Waihemo	106,932	95.0	101,585
Waikouaiti	76,583	84.0	64,329
Peninsula	17,816	100.0	17,816
Taieri	173,097	95.0	164,442
Bruce	272,203	100.0	272,203
Clutha	523,756	105.0	549,943
Tuapeka	379,301	96.0	364,128
Maniatoto	245,960	98.0	241,040
Vincent	254,451	90.0	229,005
Lake	134,262	82.0	110,094
Totals	2,650,809	97.37	2,561,033

SOUTHLAND LAND DISTRICT

County	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
Southland	2,236,020	110.0	2,481,982
Wallace	717,712	95.0	681,826
Stewart Island	2,658	70.0	1,860
Totals	2,956,390	107.07	3,165,668

DISTRICT ESTIMATES

District	Breeding ewes (as at 1953)	Estimated percentage of lambs	Estimated number of lambs
North Auckland	884,740	90.72	802,658
Auckland	2,750,678	96.14	2,644,577
Gisborne	1,225,664	89.05	1,091,525
Hawkes Bay	2,961,955	99.00	2,932,360
Taranaki	692,291	99.19	686,730
Wellington	4,582,351	97.06	4,447,667
Marlborough	617,744	87.20	538,926
Nelson	254,385	90.00	229,172
Westland	63,334	104.40	66,144
Canterbury	4,141,035	95.76	3,965,359
Otago	2,650,809	96.61	2,561,033
Southland	2,956,390	107.07	3,165,668
Totals	23,781,376	97.27	23,131,819

Dominion Totals

The following table shows the estimated lambing for the North and South Islands for the previous 5 years together with the actual number of lambs tailed:—

Year	Number of breeding ewes	Estimated percentage of lambs	Estimated number of lambs	Actual No. of lambs tailed
NORTH ISLAND				
1953	13,097,679	96.24	12,605,517	—
1952	12,717,819	93.10	11,839,659	12,007,684
1951	12,620,097	91.75	11,579,023	11,876,012
1950	12,227,145	93.96	11,489,151	11,722,316
1949	12,071,619	94.47	11,404,104	11,735,061
1948	11,865,979	89.37	10,604,844	10,867,411
SOUTH ISLAND				
1953	10,683,697	98.52	10,526,302	—
1952	10,245,527	96.78	9,916,102	10,154,586
1951	10,018,394	97.59	9,777,423	9,938,012
1950	9,654,322	97.77	9,438,768	9,516,145
1949	9,428,084	99.05	9,338,395	9,434,515
1948	9,189,503	97.04	8,917,802	8,938,474
DOMINION				
1953	23,781,376	97.27	23,131,819	—
1952	22,963,346	94.74	21,755,761	22,162,270
1951	22,638,491	94.34	21,356,446	21,814,024
1950	21,881,467	95.64	20,927,919	21,238,461
1949	21,499,703	96.48	20,742,499	21,169,576
1948	21,055,482	92.72	19,522,646	19,805,885

Bulletins for the Sheep Farmer

Free Bulletins

Nos.

171 Internal Parasites of Sheep.

180 Cobalt Deficiency in Sheep and Cattle.

189 Control of Internal Parasites by Phenothiazine.

192 Blowfly Strike in Sheep.

226 Weed Seedlings Controlled by Burner.

234 Shearing Machines.

245 Parasitic Lesions of Lamb Livers.

248 Liver-fluke of Sheep and Cattle.

265 Erecting a Seven-wire Fence.

271 Farm Shelter.

274 The Sheep and Wool Industry of New Zealand.

323 Stock Losses from Transit Tetany.

325 Foot-rot in Sheep can be Eradicated.

328 Foot Troubles in Farm Animals.

329 Chemical Methods of Weed Control.

348 Lambing Troubles.

353 Design and Construction of Sheep-drafting Yards.

355 Sheep Feeding in Canterbury.

Chargeable Bulletins

246 Shearing. 6d.

Report, Royal Commission, Sheep-farming Industry in New Zealand. 3s. 9d.

List of Registered Veterinary Surgeons. 1s.

The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

Advantages of Chemical Caponisation of Cockerels

UNTIL recent years the caponisation or castration of cockerels has been carried out by a surgical operation. To perform this operation successfully and without loss of birds some skill and instruments specially designed for caponising poultry are required. Though capons have been popular in the United Kingdom, more particularly for the Christmas trade, and in the United States, the caponisation of cockerels has been on a limited scale in New Zealand. With the introduction of chemical sterilisation or caponisation by the use of a hormone known as stilboestrol greater interest has been shown in the production of capons in this country. This has led to more inquiries being received by the Department of Agriculture regarding the results obtainable in increasing weight and improving carcass quality of birds by treating them with stilboestrol. To obtain information on these points and particularly about the cockerels normally available for table bird production in this country, a trial was conducted at the Department's Poultry Demonstration Plant, Upper Hutt. The results obtained are set out and discussed in this article by F. C. Bobby, Superintendent, Poultry Industry, Department of Agriculture, Wellington, and W. R. Belworthy, Technician at the Poultry Demonstration Plant.

THE introduction of chemical sterilisation of cockerels has greatly simplified the production of capons and has brought the production of this class of table bird within the easy reach of all poultry producers. Consequently a number of producers, who have little knowledge of capons as table birds, have become interested in this method of caponisation. Many of these have somewhat misleading ideas regarding the effects of caponising cockerels, particularly about the gains in weight to be expected with birds treated with stilboestrol. In addition inquiries have been received whether chemical caponising is as effective as surgical caponising of cockerels.

The Department has therefore planned to carry out a series of trials over several seasons with the object of supplying by practical demonstration information of the kind being sought by those interested in producing capons.

Basis of First Trial

The first trial was started on 18 December 1952 and had two main objectives: (a) To compare the efficiency of chemical caponisation with that of caponising by surgical operation and (b) to compare capons produced by both methods with untreated cockerels. It was decided to use for the first trial Australorp x White Leghorn cockerels, not because it was considered that this particular first cross cockerel was the best for the production of a good capon, but because cockerels of this cross are available in quantity every breeding season, the complementary pullets being very popular for egg production.

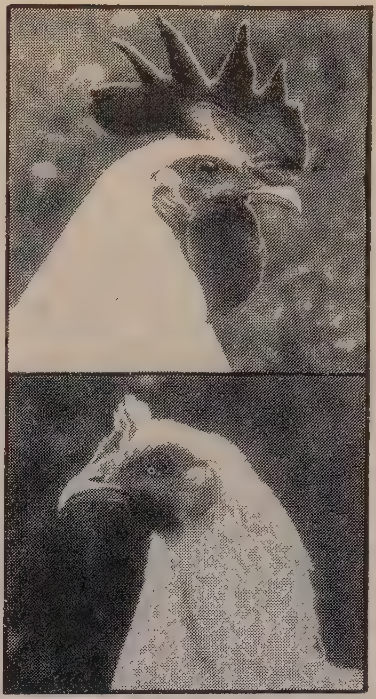
Seventy-five Australorp x White Leghorn cockerels were divided into three groups of 25 birds on a random selection basis. Treatment of these groups was as follows:—

Group 1: 25 Cockerels surgically caponised.

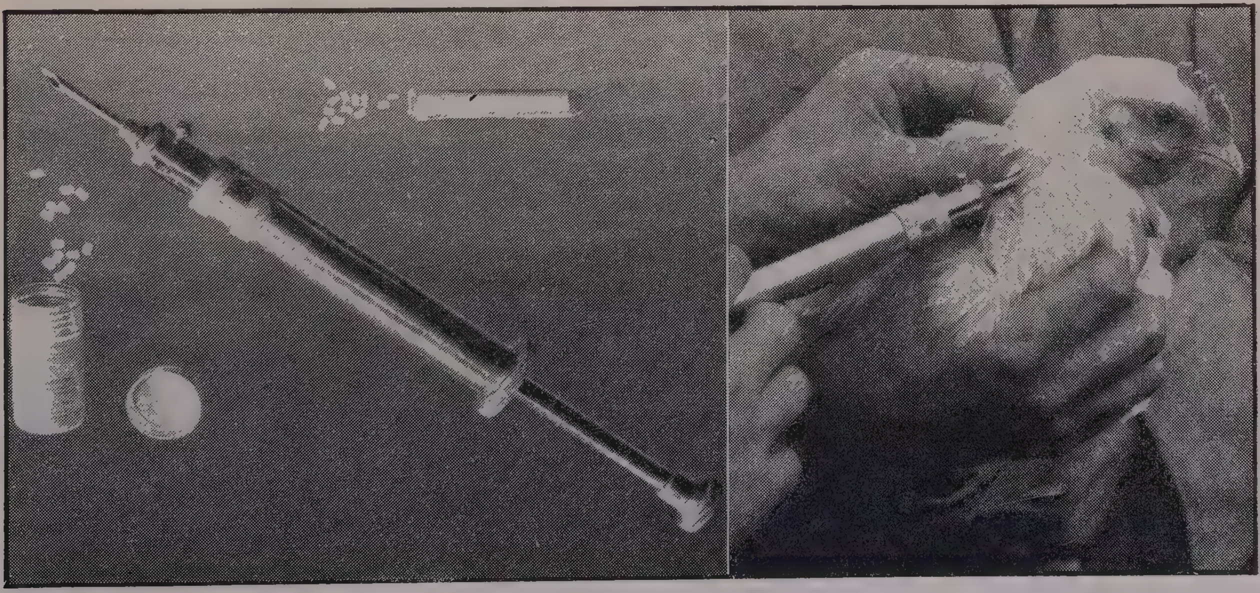
Group 2: 25 cockerels chemically caponised.

Group 3: 25 cockerels untreated.

The cockerels in all three groups were 10 weeks of age at the start of the trial. The three groups were housed intensively.



Comparison between a normal White Leghorn cockerel at 12 weeks of age (upper) and a caponised White Leghorn cockerel of the same age (lower). White Leghorns are generally not recommended for caponisation. Heavy breed birds or heavy breed crosses are preferable for this purpose.



Left—The pellets and special instrument used for caponisation of cockerels by stilboestrol injection. Right—A cockerel being injected with a stilboestrol pellet.

> "In one case it [the Pullorum germ] was found to survive on a dry piece of cloth, kept indoors for 4½ years and was still active."
> —*Extract from "Practical Poultry Keeping"*
> *A. H. & A. W. Reed, page 73.*

PAPER BAGS cannot carry Poultry Disease

ALWAYS NEW . . .
ALL WAYS NEW ZEALAND

Through the foresight and enterprise of N.Z. Forest Products Ltd., pulp for Kraft paper is now made at Kinleith from pure New Zealand Pine. Bates Multiwall Paper Bags are factory fresh; pure as the virgin pine. Help yourself and help New Zealand's sterling balance by ordering these all-New Zealand paper bags.

And referring to Coccidiosis, the same Authority says: "Under moist conditions the infective bodies [germs] will remain alive for more than a year . . . the coccidia are not killed by ordinary disinfectants . . . care should be taken to avoid introducing the disease . . ."

One way to avoid introducing poultry diseases is to buy the food in Bates Multiwall Paper Bags. They reach you NEW, with no risk of contamination from previous contact with infected flocks. And Bates Multiwall Paper Bags are easier to carry, stack and store; they empty cleanly; food does not leak out—dirt and germs cannot get in.

As a precaution against costly losses —

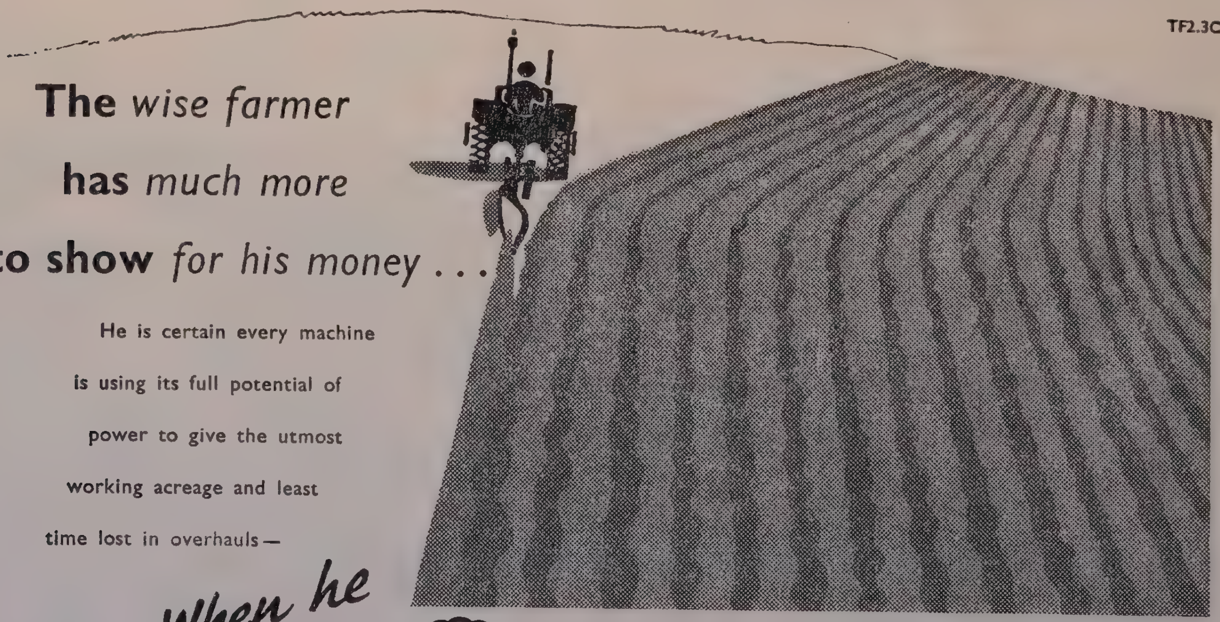
Get Your Poultry Food in

BATES MULTIWALL

PAPER BAGS

Manufactured to Bates-St. Regis Specifications
A N.Z. PRODUCT — FROM PINE TO PACKAGE.
Further particulars from **N.Z. FOREST PRODUCTS LTD.**
(Multiwall Bag Division), Penrose, Auckland.

TF2.3C



The *wise farmer*
has *much more*
to show *for his money . . .*

He is certain every machine is using its full potential of power to give the utmost working acreage and least time lost in overhauls—

When he insists on **SHELL PRODUCTS**

and acid-neutralising

SHELL MOTOR SPIRIT
SHELL DIESOLINE
CROSS POWER KEROSINE
SHELL X-100 MOTOR OIL

The Shell Company of New Zealand Limited (Incorporated in England)

Treatment of Birds

The cockerels in group 1 were surgically caponised by a veterinary officer of the Department on 11 December 1952, a week before the trial was started. It was considered reasonable to permit the birds a week in which to recover from the effect of the operation before starting to record food consumption. Birds in group 1 received no other treatment after the surgical operation.

The cockerels in group 2 were treated with stilboestrol on 18 December, each bird receiving one 15 mg. pellet injected under the skin of the neck close to the head. The illustrations at the bottom of page 19 show the pellets, the injector gun that was used, and the way that the birds were injected. Cockerels treated in this way slowly absorb the stilboestrol, which arrests the growth of the testicles. At the same time the male characteristics such as the comb, wattles, and sickle feather cease to develop and the comb appears to recede in size.

The cockerels in group 2 were given a further injection of stilboestrol pellets, each cockerel receiving an additional pellet 6 weeks after the first injection or when 16 weeks of age.

The cockerels in group 3 received no special treatment and acted as a control pen for the other two groups.

Feeding of Birds

For the purpose of simplicity in the recording of food consumed all three groups of cockerels received dry mash and grain. The dry mash hoppers were open to the birds all day, thereby allowing them to consume as much as they required. One feed of grain was given daily and was fed in trough at the end of the afternoon. The mash ration used was made up of bran 24lb., pollard 22lb., wheat meal 25lb., barley meal 6lb., maize meal 13lb., and meat meal 10lb., a total of 100lb. The two constituents of the grain ration were wheat 75lb. and maize 25lb.

Results Obtained

Three aspects of the trial are of particular interest in an analysis of the results—the gain in weight, the amount of food consumed, and the quality of the birds in each group respectively. It was also considered to be of importance to assess the optimum age at which the capons should be killed and marketed.

Gain in Weight

Unfortunately, owing to a misunderstanding, the cockerels in each group were not weighed at the beginning of the trial. Consequently it is not possible to record gains in weight for each group at the end of the 4th week of the trial or when the birds were 14 weeks of age. Gains in the average liveweight per bird in pounds were as follows:—

Age of birds	Group 1 (surgical)		Group 2 (chemical)		Group 3 (control)	
	Average weight	Gain in weight	Average weight	Gain in weight	Average weight	Gain in weight
14 weeks	4.16		4.28		4.04	
18 weeks	5.42	1.26	5.70	1.42	5.08	1.04
21 weeks*	6.27	0.85	6.80	1.10	6.08	1.00
26 weeks	7.16	0.89	7.71	0.91	6.85	0.77
Total gain in weight between 14th and 26th weeks ..		3.00		3.43		2.81

* Weighings were made at 21 weeks of age instead of at 22 weeks owing to birds being removed at this age for quality tests referred to later.

Food Consumption

The consumption of mash and grain in pounds per bird was as follows:—

Age of birds	Group 1 (surgical)			Group 2 (chemical)			Group 3 (control)		
	Mash	Grain	Total	Mash	Grain	Total	Mash	Grain	Total
10-14 weeks	6.08	1.30	7.38	6.72	1.20	7.92	5.76	1.06	6.82
15-18 weeks	6.31	2.93	9.24	6.08	2.72	8.80	5.66	2.78	8.44
19-21 weeks*	6.18	2.66	8.84	6.52	2.00	8.52	6.32	1.95	8.27
22-26 weeks†	8.61	6.77	15.38	10.25	6.35	16.60	6.59	6.02	12.61
Total food consumed between 10th and 26th weeks ..			40.84			41.84			36.14

* A 3-week period. † A 5-week period.

Only one bird died during the trial. This death occurred in group 1, where a bird succumbed to the effects of the surgical operation.

Quality of Carcasses

A decision was made to kill and examine a batch of birds when the cockerels were 21 weeks old or 11 weeks after the trial started. This batch included 6 birds from group 1, 5 birds from group 2, and 2 birds from group 3. These cockerels were plucked, tied down, and examined. Later they were dressed for the oven and cooked.

It was difficult to assess the quality of the birds examined, and only comments based on careful observation and considered opinion can be given. The outstanding difference between the capons from groups 1 and 2 compared with the cockerels in group 3 was the amount of additional fat carried by the capons. This fat was deposited around the pelvic bones and under the skin of the flesh on either side of the breastbone. A large proportion of fat was present on the capons, whereas the cockerels carried little or no fat. It was also noted that the capons carried rather more breast meat than the cockerels. The capons presented an attractive appearance as table birds. The cockerels were average in appearance and lacking in the "bloom" apparent on the capons; that is, the cockerels were "drier" in the appearance of the flesh. There was no apparent difference in quality between the surgically and chemically caponised birds.

When cooked the flesh of the capons was more tender and succulent than that of the cockerels. The legs of the capons, the "drumsticks" in particular, were less hard and stringy than those of the cockerels.

A further batch of capons were killed and cooked when 26 weeks of age. In appearance they were similar to those killed at 21 weeks, but when they were cooked the eating quality had deteriorated from that of the first batch. It was noted particularly that the flesh on the legs had hardened and was becoming unpalatable.

Analysis of Results

This trial revealed the following points of interest:—

1. There was no substantial difference in weight in 16 weeks between the capons and the cockerels. This refers only to the cross used in the trial; it is conceivable that with, say, Light Sussex x Rhode Island Red cockerels, the difference in weight between capons and cockerels at 20 to 26 weeks might be greater. However, caponisation of cockerels generally achieves an improvement in the quality of the carcass as a table bird rather than a gain in weight. It is in this respect that producers get a misleading idea regarding the caponisation of cockerels. They expect a much greater gain in weight than usually occurs. In this trial group 2, recording the highest gain in weight, showed an advantage of only about ½lb. per bird over group 3.

2. The capons in groups 1 and 2 over the period of the trial consumed about 5lb. of food per bird more than the cockerels in group 3. This is an aspect of capon production which requires careful consideration when the cost of production of capons is being assessed in comparison with that of cockerels and when the return for each class of bird is examined. No special fattening ration was used at the later stages of producing these birds and yet the capons were fully fleshed and carrying all the fat desirable.

3. The chemical method of caponisation produced birds equal in growth and quality with birds which had been surgically caponised. There is some gain by the chemical method of caponisation in that (a) there is less likelihood of losses which may occur when birds are surgically caponised, and (b) there is no check or setback for birds which are chemically caponised. The effect of injecting stilboestrol tablets becomes obvious within the first month after the injection.

4. There is a significant difference in the quality of the carcass of a capon and that of a cockerel, both in market appearance when it is killed and plucked and also in palatability when it is cooked and eaten.

5. Australorp x White Leghorn cockerels, if caponsied, reach their prime for marketing and palatability as capons at from 21 to 22 weeks of age when treatment with stilboestrol is started at 10 weeks of age.

Course for Poultry Producers

A 3-day instructional course for poultry producers will be held at Massey Agricultural College between 9 and 11 February. A registration fee of £1 is payable and hostel accommodation is available at the college for £2 12s. 6d.

The course will consist of a series of lectures by officers of the Department of Agriculture, members of the staff of Massey Agricultural College, and poultry farmers.

Further information may be obtained from the Registrar, Massey Agricultural College, Private Bag, Palmerston North.

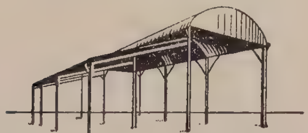
FAMOUS LYSAGHT'S

BARNS

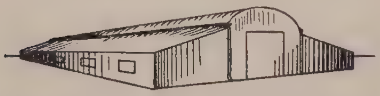
and

SHEDS

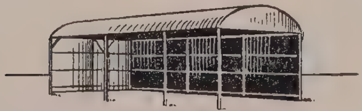
Again Available



Lysaght's Hay Barn with Lean-to Shed on one side suitable for Implement Storage.



Lysaght's Barn with covered ends and Lean-to Sheds on both sides suitable for many purposes.



Lysaght's Barn sheeted one side one end.

Limited Supplies of these popular Pre-fabricated, ready-to-erect, steel-framed Barns and Sheds again to hand in the following sizes:—

STANDARD BARN A
21ft. wide, 16ft. high to eaves. Lengths: 30ft., 45ft., and 60ft.

STANDARD BARN B
24ft. wide, 16ft. high to eaves. Lengths: 45ft., 60ft., 75ft., 90ft. and upwards.

IMPLEMENT SHEDS

(For attaching to 21ft. wide Barn):
15ft. wide, 9ft. 9in. high on outside, falling from 16ft. inside. Lengths: 30ft. 45ft., 60ft.

(For attaching to 24ft. wide Barn):
20ft. wide, 9ft. 9in. high on outside, falling from 16ft. inside. Lengths: 45ft., 60ft., 75ft., 90ft. and upwards.
Roofing (and walls if required) in High-quality Galvanised Corrugated Iron. Your farm staff can erect these Barns and Sheds. Everything BOLTS together! No riveting or welding! Every section fully pre-fabricated and easily handled. Full directions and easily followed plans supplied.

SEND COUPON TODAY!

L. J. FISHER & CO. LTD.,
30 Anzac Avenue, Auckland.

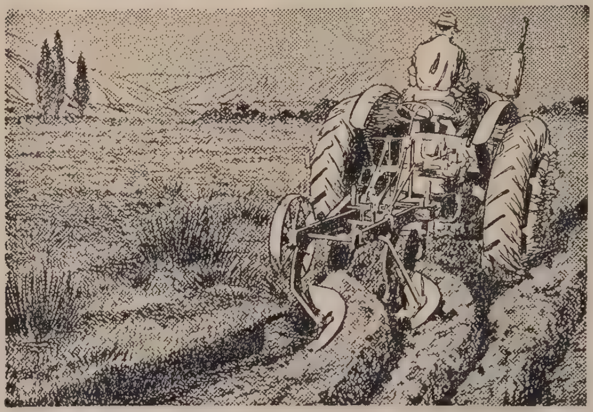
Please send me full details of Lysaght's Barns and Sheds.

Name ....

Address ....

.... J.A./2

REID & GRAY *serve the man on the land*



MOUNTED SEMI-SWAMP PLOUGH (Ploughs 2-16in Furrows)

Full mounted principle—simple adjustment to vary width of furrows. This rugged hydraulically-lifted plough has, like all other R. & G. ploughs, been specially developed to meet specific New Zealand conditions. Farmers throughout the length and breadth of this country rely on and recommend farm machinery that bears the name Reid & Gray.

REID & GRAY LTD.

Head Office and Works:
BURNSIDE, OTAGO.
Branches at Invercargill, Gore and Balclutha.
F.22.

AGENTS—Auckland: Alfred Buckland & Sons Ltd.; Hamilton: Newton King Ltd.; Gisborne: Tractor & Machinery Co. Ltd.; Palmerston North: Reid & Gray Agency Co. Ltd.; New Plymouth: J. B. MacEwan & Co. Ltd.; Masterton & Nelson: Levin & Co. Ltd.; Blenheim: R. Cresswell & Sons Ltd.; Greymouth: Greymouth Motors Ltd.; Christchurch, Ashburton, Timaru, Waimate and Oamaru: National Mortgage & Agency Co. of N.Z. Ltd.

defeat the Blowfly
with
SHELL DEFIANCE
Blowfly Oil

(Registered pursuant to the Stock Remedies Act, 1934)

To prevent blowfly strike, keep the wool short where soiling is likely, and apply SHELL DEFIANCE BLOWFLY OIL to any injuries caused by shears, lamb marking and other causes. SHELL DEFIANCE BLOWFLY OIL quickly renders the area of application immune to blowfly attack. Keep a tin handy . . . economical in use, lasting in effect.

For free, illustrated booklet, "Defeat the Blowfly," write to your nearest depot.

You can be sure of SHELL

SHELL

THE SHELL COMPANY OF NEW ZEALAND LIMITED
(Incorporated in England)

Harvesting the Honey Crop

Seasonal Notes for the Domestic Beekeeper

IF the weather has been favourable, colonies should have gathered a crop of surplus honey by this time. In some districts the honey flow may not have finished yet, but it is advisable to remove the honey when it has been capped over by the bees but before the flow has ceased. In this article T. P. J. Williams, Apiary Instructor, Department of Agriculture, Hamilton, discusses methods of removing and extracting the crop of surplus honey.

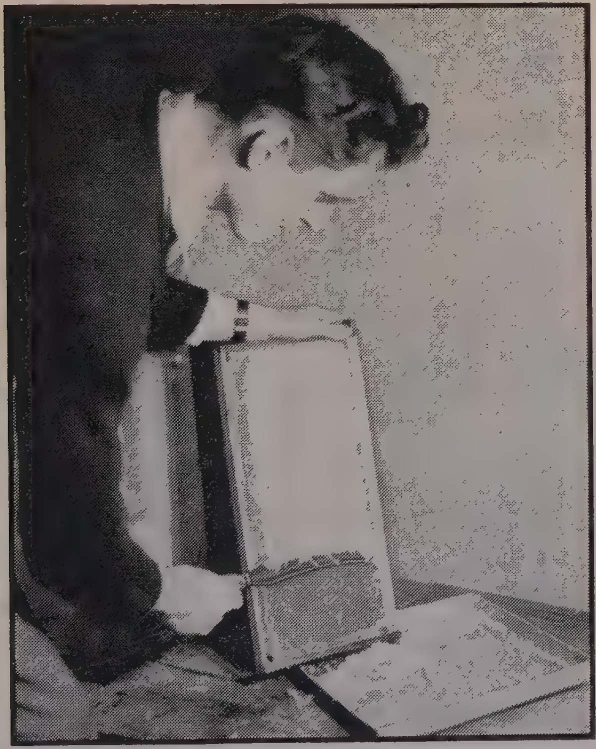
BEEKEEPERS removed honey from colonies in earlier times by killing all the bees with sulphur fumes and extracting the honey by crushing the combs and allowing the honey to drain off or by melting them, which left the wax on top of the honey when the mixture had cooled. These methods produced a product far inferior to that which is produced today. Such crude methods have been replaced with the advent of the movable frame hive, which enables honey to be removed from colonies without a single bee being destroyed. With the invention of the honey extracting machine combs may be used many times, for after the cappings are removed from the cells the honey is thrown out by centrifugal force and the combs returned to the hives for further use.

It is advisable to have most of the honey removed before the flow has ceased and so avoid robbing, which becomes prevalent after the flow has ended. If the weather is warm and sunny, no time should be lost in removing and extracting the crop, but if the weather is wet, the honey should be left on the hives. Honey will rapidly absorb moisture, and if exposed in damp weather, will take in excessive moisture and later start to ferment. Partly capped combs of honey should be left on the hive to be completely capped before they are removed, as honey in uncapped cells will not have been ripened by the bees and if extracted may soon sour.

During a heavy honey flow the beekeeper realises the value of plenty of drawn combs. Where a beekeeper finds himself short of combs the only way to secure a good surplus of honey is to keep on extracting from the combs as soon as they are filled and capped, and then return them to the hive to be refilled.

Removing Honey

The bee escape board method is the most effective and safe way of removing honey from colonies. The board is placed on the hive late in the afternoon and the honey is removed early the following morning. The escape board is placed beneath the super of honey to be removed by the super being tilted up from the box below and the board slid between the two. The outlet to the board should not be obstructed by burr comb. The bees in this super will find the exit in the board and rejoin the bees below. They are then unable to return to the super above. The honey may then be removed by the beekeeper the next morning without the hive being disturbed. These boards are fairly simple to make, and particulars of them may be obtained from the local Apiary Instructor.



Cutting the cappings from a comb of honey. The operator is holding the comb incorrectly, and if the knife should slip it would cut his thumb. The thumb should rest along the top of the bar out of the way of the knife.

Uncapping Combs

An uncapping knife is necessary for the removal of the wax cappings from the cells of each comb. Such a knife is specially made for the purpose and has a heavy blade about 8in. or 9in. long and nearly 2in. broad. It must be kept extremely sharp if the best results are to be obtained. Some beekeepers prefer to keep the knife hot by placing it in hot water after doing each comb, but care must be taken to wipe the knife each time so that no water gets into the honey.

An uncapping box may be made from a super. A bar is nailed across the super with a nail projecting upward 1in. from about the middle of the bar. The end bar of the frame rests on the nail. The knife is moved back and forth from the bottom of the comb and the film of wax covering the cells is carefully cut off. The cappings will then slide off into the box, which should have wire gauze tacked to the bottom. Any honey will then drain out of the cappings and run into a container beneath the box. Good thick combs make uncapping easier so it is therefore a good plan to have no more than 8 frames to each honey storage super.

Extracting Honey

Beekeepers who have only one or two hives may feel that these do not warrant the expense of an extractor. The honey may be extracted by scraping each side of the comb with a spoon, leaving the midrib of foundation wax intact. This method was fully described in the January 1953 issue of the "Journal".

Where the beekeeper has a two-frame honey extractor the first essential is to see that it is fixed firmly to the floor or stand; otherwise it will rock and vibrate and break combs when it is in use. Anchoring rods are usually supplied with the extractor for this purpose. The extractor handles two combs, so if possible these should weigh about the same, which makes for smoother running. The handle of the extractor should be turned slowly at first and the speed gradually increased. If the honey is not too dense, about 20 turns of the handle will be sufficient to throw the honey out.

Straining Honey

The honey should be strained to remove all particles of wax, and this is best done straight after it has been extracted. It could run from the extractor into a bucket over which is placed a coarse wire gauze strainer to catch the larger portions of wax. From the bucket it should be tipped into a settling tank. A good cheesecloth should be tied over the tank and allowed to sag slightly. When the weight of a few buckets of honey is in it it will then sag well down into the tank. The honey will then strain through the centre in a column, thus eliminating air bubbles.

The honey should be left in the tank for a couple of days to allow wax particles and the like to come to the top in the form of a scum, which is then skimmed off.

Wet Combs

Where possible wet combs should be returned to hives after extracting, preferably in the evening. This will avoid any danger of robbing.

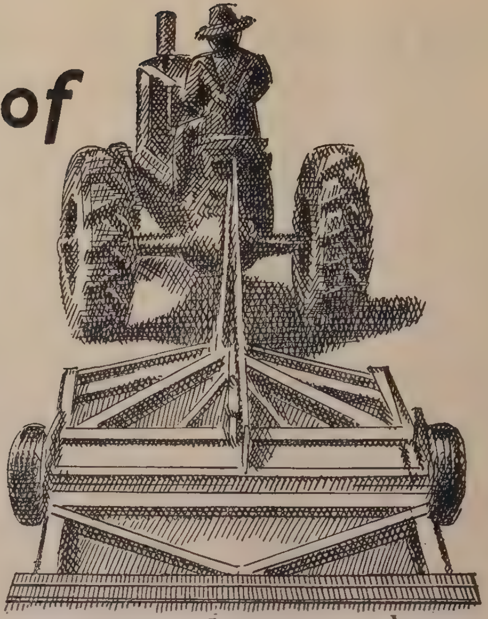
A limited shipment of

EVERSMAN

LEVELLERS

has arrived ! ! !

EVERSMAN is the ideal utility implement for use in every soil conservation practice. Contour planting, terracing, surface drainage, building of grass waterways, elimination of gully erosion and preparation of meadows and pastures before permanent seeding—all can be accomplished easier and with greater saving in time and labour by using an EVERSMAN *with your own tractor*. For Automatic Levelling, wheels control blade movement through Patented crank axle.



The All-purpose
EVERSMAN LAND LEVELLER
for Irrigation work, Dirt moving
and Seed Bed finishing
Patents applied for
Price approx. £285

Enquire today from the nearest branch of

DORING IMPLEMENT SUPPLIES LTD.

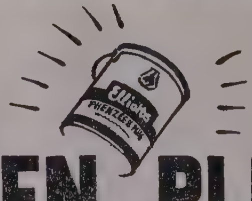
19 Clyde St., Whangarei.
P.O. Box 632 Hamilton.
Waihi Road, Hawera.
P.O. Box 548 Palmerston North.
P.O. Box 99, Gore.
P.O. Box 1179 Wellington.
Bledisloe Avenue, Stoke, Nelson.
P.O. Box 1203, Christchurch.

DE.2.13

I'm sticking to the DRENCH that has served me for years

There is nothing "fancy" about Elliotts Phenzeen Plus. It is a straightforward honest-to-goodness preparation, designed to control internal parasites in sheep—and it does that job well. The most important thing about a phenothiazine drench is that the drug should not settle out. Every dose should give every sheep the proper amount of phenothiazine. To ensure that you receive Phenzeen Plus in perfect condition, Elliotts are now manufacturing it here, through their New Zealand Company: Ellco Ltd.

Elliotts



Stick to the phenothiazine drench you *know*—stick to **PHENZEEN PLUS**

Manufactured by Elliotts N.Z. Company, Ellco Ltd., Auckland, N.Z.

Flushing of Ewes in Fat Lamb Production

By J. C. GERRING, Animal Research Extension Officer, Department of Agriculture's Ruakura Animal Research Station

TO mark over 130 lambs for every 100 ewes put to the ram, year in year out, would be considered a creditable achievement by any New Zealand fat lamb farmer. Yet this is now immediately possible, if the findings of L. R. Wallace, Chief Nutrition Officer, Department of Agriculture's Ruakura Animal Research Station, are correctly applied. To do so breeding ewes must make substantial increases in their liveweight over a period of at least 3 weeks immediately before the onset of the breeding season. The flock should be kept on a high level of feeding for 5 weeks after the ewes start taking the ram.

IN last month's "Journal" Dr. Wallace outlined his views on the management of the fat lamb flock. He considered that the practice of flushing was one of the key factors in increasing the efficiency of fat lamb production. This article describes in detail how a flock of ewes should be flushed and the results which can be expected if the practice is properly applied.

What is Flushing?

To most farmers the term "flushing" is a familiar one. It has long been known to increase the number of lambs born per ewe. Just how should ewes be flushed to get the greatest possible number of lambs? It is surprising how little information has been available to answer this question. Particularly is this so in New Zealand, because here flushing is a highly profitable practice. Under grassland conditions it involves no capital cost and virtually no additional physical effort. Every extra lamb fattened from the same number of ewes cuts down the feed cost per lamb and so increases the farmer's net returns; for the feed required to fatten the lambs includes not only that eaten by the lambs themselves, but also the amount consumed by the ewes over the whole season. A greatly increased lambing percentage thus spreads the heavy overhead feed cost of the ewes over a greater quantity of marketable meat.

Experiments Described

During each of the 1949 and 1950 seasons 300 cast-for-age 5-year-old ewes were purchased early in February from two widely separated hill country districts. Both lots of ewes were in fairly thin but vigorous condition typical of the class of ewe bought by many fat lamb farmers. After their arrival at Ruakura the ewes were run together under fairly hard grazing conditions until late February. They were then split into two even groups, each of 150 ewes. One group was flushed by being put on to good pasture for a period of 6 weeks; pasture which was specially saved for this purpose. The second group acted as a control and was grazed for the same period on pastures which it was considered would permit neither gain nor loss in body-weights. At the end of the 6 weeks both groups were again run together as a single flock, under quite hard grazing conditions.

One week after the flushing treatment had begun 4 fertile rams were turned out with each group of ewes. Each morning the rams were freshly raddled, and at the same time a note was made of those ewes which had been tupped during the previous 24 hours. The colour of the raddle used was changed each fortnight. As the ewes were individually identified by ear tags, it was possible to keep complete records of when each ewe was tupped, and whether she held to the first, second, or subsequent matings.

Questions on Flushing

AS Chief Nutrition Officer at Ruakura, interested primarily in the efficiency with which animals convert grass to human food, Dr. Wallace has been making a special study of the effect of flushing on the lambing performance of a fat lamb flock. He wanted to know:—

1. How long should ewes be flushed before being mated?
2. How long should flushing be continued after the ewes start taking the ram?
3. Do ewes that are flushed come into season any earlier than those not flushed?
4. Does flushing affect the percentage of dry ewes?
5. What gains in weight must ewes make for flushing to be really effective?
6. To what extent will flushing increase the lambing percentage.

The experiments described in this article were designed and conducted by Dr. Wallace to answer these questions in clear-cut, specific terms.

At lambing the number of lambs produced by each ewe was recorded. Since it was known, from the tupping records, how long each individual ewe was flushed before being successfully mated, it was possible to determine the precise effect of different periods of flushing on the percentage of twins born.

HEADING PHOTOGRAPH: Ewes used in flushing experiments at Ruakura Animal Research Station with their lambs.

How Long Should Ewes be Flushed?

The results in the flushed group, compared with the group which was not flushed at all, are set out in Table 1.

TABLE 1—EFFECT OF LENGTH OF FLUSHING ON TWINNING

Week of tupping period	Percentage with twins Flushed	Not flushed
1	17	13
2	25	16
3	34	7
4	44	7
5	25	—
6	56	—
7	45	—
8	—	—
9	—	—

As the flushing treatment was begun 1 week before the rams were turned out, those ewes successfully mated during the first week of the tupping period had been flushed for 1 to 2 weeks. Similarly, those ewes which held to the ram during the second week of the tupping period had been flushed for 2 to 3 weeks, and so on.

Table 1 shows that the percentage of ewes giving birth to twins was consistently higher in the flushed group throughout mating compared with the group which was not flushed at all. More important still a progressive increase in the percentage of twins occurred up until the fourth week of the tupping period, when 44 per cent. of the ewes mated produced twins against only 7 per cent. in the control flock. In other words a period of 4 weeks of flushing was necessary before each ewe was mated to obtain the maximum effect. How can this finding be applied on a flock basis to get this maximum effect on the greatest possible number of ewes?

By running raddled teaser rams with the ewes from the time they arrived at Ruakura until they were replaced by the fertile rams, it was possible to record the exact day on which each ewe came in season, both before and during the tupping period. From these records it was found that in the early part of the breeding season, only a few ewes came on heat each day. This was followed by a very rapid increase in the number of ewes coming into season, so that a high proportion of the ewes took the ram over a period as short as 4 or 5 days. If flushing is to be really effective, it must obviously be started 4 weeks before this peak in mating occurs. It can have no possible influence on ewes which are already in lamb. Farmers need to anticipate therefore when the majority of ewes will first be coming in season after the rams are introduced. This seems to vary with the district in which the ewes are bred, so that ewes from one hill country area may come in season on average up to 3 weeks earlier than those from another district. Previous experience and knowledge of when the peak in lambing occurs are the only guides in this respect.

If the introduction of the rams coincides with the onset of the breeding season, then flushing of the ewes should be started 3 weeks before this date.

How Long Should Flushing be Continued?

How long should flushing be continued after mating begins? It has been found that most of the ewes take the ram over the first 17 days of the breeding season, and all but a few of the remainder do so in the second 17 days. Since over 90 per cent. of ewes mated during this period hold to the ram, it is important that the ewes be in a highly fertile state over these first 34 days, or 5 weeks, of the breeding season.

Flushing should be continued therefore for a further 5 weeks after the ewes start taking the ram.

Do Flushed Ewes Breed Earlier?

The opinion is widely held that flushing will bring ewes in season earlier than normal. There is no evidence from these experiments to substantiate this belief. It was found that ewes from one particular hill country district took the ram about 10 days earlier on average than did those from another area. As previously mentioned, similar and even larger differences in this respect have been noted in other experiments. From this it seems that more attention should be given to the source of ewes if early lambs are required.

Does Flushing Increase Dry Ewe Percentage?

From the detailed tupping records it was found that the flushing of ewes makes them slightly more difficult to get in lamb. Table 2 shows the percentage of ewes which held to the first and second service in both the flushed and unflushed groups.

TABLE 2—PERCENTAGE OF EWES HOLDING TO SERVICE (1949 and 1950)

	Flushed Per cent.	Not flushed Per cent.
Ewes which held to first service	75	91
Ewes which held to second service	15	7

Of the ewes mated during the first two rounds, 34 days, of the breeding season 90 per cent. held to the ram in the flushed group compared with 98 per cent. in the control group. However, providing the rams are left out with the ewes for 9 to 10 weeks to give the few remaining ewes additional opportunities to get in lamb, flushing will not result in many more dry ewes. The effect of this is shown in Table 3.

TABLE 3—PERCENTAGE OF DRY EWES

Tupping period (weeks)	Percentage of dry ewes Flushed	Control
9	6.9	5.9
8	7.2	5.9
7	9.2	6.2
6	12.8	6.9

What Liveweight Gains are Necessary?

One further aspect is essential. Flushing must result in the ewes' making rapid and substantial gains in liveweight, and in holding this increased weight over the whole of the flushing period. The importance of this is well illustrated in Table 4, which shows the average liveweight changes of a group of ewes which were flushed for 8 weeks, 3 weeks before and 5 weeks after the rams were introduced.

TABLE 4—WEEKLY LIVEWEIGHT CHANGES OVER FLUSHING PERIOD

	lb.
At start of flushing	112
After 1 week	127
After 2 weeks	128
After 3 weeks (rams introduced)	127
After 4 weeks	127
After 5 weeks	127
After 6 weeks	129
After 7 weeks	128
After 8 weeks	129

Fifty per cent. of the ewes in this particular flock lambed twins. Ewes must put on condition rapidly therefore to be in a highly fertile state. If they are already fat, flushing is made more difficult and is less likely to be effective. During the main grass growing season ewes grazing with their lambs on the best pasture available tend to become overfat. At the end of the spring flush when pasture growth is starting to decline the ewes are competing with their lambs for the available feed. By this time the rate at which lambs grow is almost entirely dependent on the grass they eat. The small amount of milk denied them by weaning at this stage is more than compensated for by the greatly increased amount of feed which can be made available to the lambs alone. Where intensive fat lamb production is the aim a policy of early weaning has at least three advantages. It increases the amount of grass which is converted directly to meat by the lamb itself. The ewes can be hard grazed so that they are in an ideal thin but thrifty condition before flushing. Feed can be saved for flushing.

Though these experiments were carried out on grass alone, it is believed that the principles of flushing established by this work apply whether ewes are fed on grass or grain. Providing the ewes put on condition rapidly, the type of feed used for flushing is unimportant. Experience at Ruakura suggests that pasture which has been allowed to grow for a few weeks and has hardened off is more suitable than rapidly growing lush pasture which is high in moisture content. In addition it is a wiser policy to provide saved feed, by shutting paddocks for a few weeks before they are required, than to rely on an early autumn break to stimulate grass growth.

How Effective is Flushing?

With this basic information further investigations were made by Dr. Wallace in the 1951 and 1952 seasons to see just how a properly executed system of flushing would affect the final lambing percentage of a fat lamb flock. As in the previous years agemarked 5-year-old Romney ewes were purchased off hill country. Each flock consisted of a good even line of ewes in hard but thrifty condition, typical of cast-for-age sheep used by many fat lamb farmers.

After arrival at Ruakura early in February of each year the 300 sheep were run together as one mob, under fairly hard grazing conditions. In mid-February after being ear-tagged, weighed, and graded for condition the ewes were divided into four comparable groups (A, B, C, and D), each of 75 ewes.

From then on each group was managed so that when the rams were joined in early March Group A had been flushed on good pasture for 3 weeks, Group B for 2 weeks, and Group C for 1 week. The flushing treatment of Group D was started on the day the rams were turned in with the ewes. Flushing of the whole flock was continued for a further 5 weeks after the rams had been introduced. The whole flock was then run under fairly hard grazing conditions to enable reserves of feed to be built up for the winter. Rams remained with the flock for a period of 10 weeks in all. Table 5 sets out the results of the different flushing treatments on the effective lambing percentage in each group.

TABLE 5—EFFECTIVE LAMBING PERCENTAGE

	Groups			
	A	B	C	D
Flushing period before tupping (weeks) ..	3	2	1	0
Lambs alive at 28 days as percentage of No. of ewes put to ram	131	121	112	111

These results provide clear-cut evidence that ewes must be flushed for at least 3 weeks before the onset of the breeding season to get the greatest possible increase in effective lambing percentage. If the period of flushing is shorter than this, then the lambing percentage will be correspondingly reduced. They also indicate that 130 per cent. of lambs can be confidently expected from 5-year-old Romney ewes if they are properly flushed. This is a net gain of 20 per cent. due merely to better management and is obtainable at no extra cost.

Lamb Mortality

Detailed records of losses in lambs in these and other experiments at Ruakura have shown that approximately 14 per cent. of twin lambs are either born dead or die during the first month, compared with 7 per cent. of singles. Investigations show that these losses are not due to any one particular cause that can be easily prevented. Rather are they the result of a great variety of different conditions, none of which is important as a single entity, but when added together they account for an impressive total. No amount of time and labour at lambing time, extra to that spent by most farmers, can safeguard against all these different hazards.

These experiments provide convincing evidence, however, that intelligent management at tupping time can be much more effective in raising the final lambing percentage than strenuous physical efforts during the lambing season. The increased number of twin lambs arising from good flushing is more than sufficient to compensate for their higher death-rate.

Conclusion

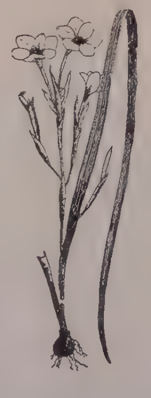
Fat lamb farming, especially in the North Island, is for the most part tied to the use of cast-for-age Romney ewes bred on the hills. If such ewes are inherently lower in fertility than other breeds, then they are less suitable for intensive fat lamb production. In all other respects the Romney is ideally suited to New Zealand's grassland environment. Before a change to any other breed is considered, an enlightened system of flushing could be more widely practised to exploit the potential fertility which these experiments have shown already exists in the Romney.

Spread of Poisonous Cape Tulip Must be Checked

Contributed by the Extension Division

CAPE tulip, a pretty South African plant that has been introduced and sold as a garden plant in New Zealand, has now become a serious weed in different parts of the country. Because it is poisonous to humans and animals, farmers and householders are urged to take care that its spread is not encouraged by the planting of it in flower gardens. Where it is already growing in home gardens it should be destroyed by being dug up and burnt.

IN South Africa and Australia Cape tulip is an extremely serious weed of pastures, and in the latter country the pest extends over about 130,000 acres. It has so far become established on farmland in New Zealand only to a limited extent in Hamilton Bay in the Marlborough Sounds, on a smaller area near Whangarei, and on Portland Island at the tip of Mahia Peninsula, 30 miles south of Gisborne. However, plants have been traced as far afield as Auckland, Marton, Hastings, and Wairoa.



Flowering stem, leaf, and corm of Cape tulip.

Prolific Seed Setting

If it becomes widespread on hill country pastures, it will probably become ineradicable because of its prolific seed setting (in one season a single plant may produce from 3000 to 6000 seeds), its capacity to thicken up an infestation underground by multiplication from the parent corm, and its relative immunity to chemical and hormone weedkillers. The whole of the Cape tulip plant is poisonous and it does not become innocuous when dry.

Satisfactory control of Cape tulip has been achieved by close planting of *Pinus radiata* at Hamilton Bay. It has been found that where the shade is thickest there has been a complete suppression of the weed, though viable bulbs may still remain in the soil. On Portland Island Cape tulip has increased during the last 7 years from a few plants to a dense infestation over at least 70 acres, the present thick danthonia sward being powerless to prevent its spread.

A "Garden Escape"

Like many other New Zealand weeds, Cape tulip is a "garden escape"; that is, it has been introduced and cultivated because it is an attractive ornamental plant. Some such weeds increase rapidly and become pests if they "escape" from the confines of a garden, and once Cape tulip gains a hold it is very difficult to destroy. Some people may dig out these plants from their flower gardens and dump them on a nearby empty section or put them in their rubbish tins for emptying on the local tip, but such practices are effective ways of spreading the pest. The only satisfactory method of destruction is digging out the plants and burning them, but owing to the very small corms, some of which may be left in the soil, it may take several years before the garden is entirely free.

An infestation of Cape tulip in pasture.

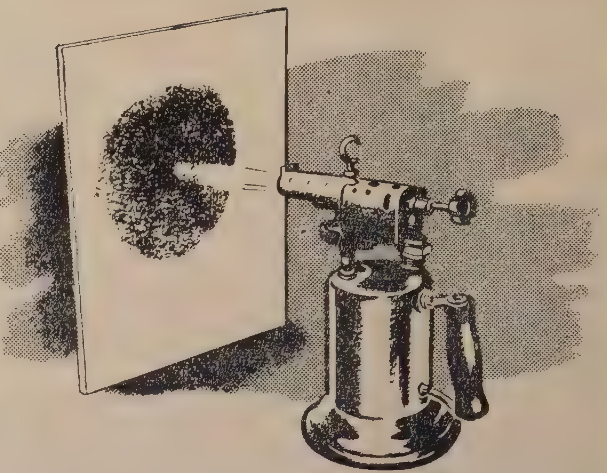
Cape tulip has an attractive orange-scarlet flower and a leaf similar in shape and texture to those of daffodils. Though each corm grows only one leaf each season, the rapid multiplication of the corms and the prolific seeding result in the plant forming dense clumps with leaves up to 3ft. or more in height. The plant blooms profusely from early spring onward and during the season one plant may produce up to 40 orange-scarlet flowers.

People who have Cape tulip in their gardens are asked to destroy it and not give plants to friends, irrespective of how attractive they consider the flowers. Anyone knowing of any growing Cape tulip plants is urged to inform the nearest office of the Department of Agriculture. In doubtful cases the suspected plants should be sent to the Department for identification.

◆

HERE'S PROOF

GIBRALTAR BOARD is FIRE-SAFE



- ★ 1000 degree fire test proves beyond doubt Gibraltar Board is a definite fire-stop.
- ★ After five minutes' exposure—virtually no effect.
- ★ After twenty minutes solid gypsum-pumice core was still intact.

Play safe. Line YOUR walls and ceilings with the FIRE-SAFE Wallboard.

Distributed by Winstone Ltd.

★FOR HEALTHIER SHEEP USE—

YOUNG'S SHEEP DIPS

efficient !
safe !
sure !

Backed by many years' experience and research by a qualified staff of chemists in a fully equipped laboratory. You can be assured of safe and efficient products particularly suited to your requirements.

CHOOSE FROM THIS COMPREHENSIVE RANGE—

GREEN LABEL PASTE DIP
Gammexane and Phenols combined in a form which ensures destruction of keds (ticks) and lice at all times. Non-Arsenical.

IMPROVED SHEEP DIP POWDER
Arsenical Sulphur preparation fortified by Gammexane.

DEFLY SPRAY
Contains D.D.T. for prevention of maggot or blowfly strike. Lethal to flies on contact and prevents laying of eggs in fleece.

BUISTMARK BRANDING FLUID
Green, Red and Blue. Fully approved by the Department of Agriculture.

YELLOW LABEL PASTE DIP
Destroys ticks and lice and gives efficient protection against BLOWFLY at one dipping. Arsenical.

RED LABEL PASTE DIP
Derris Arsenical. For all external parasites.

FOOT ROT SOLUTION, FOOT ROT PASTE
Absolute efficiency with economy.

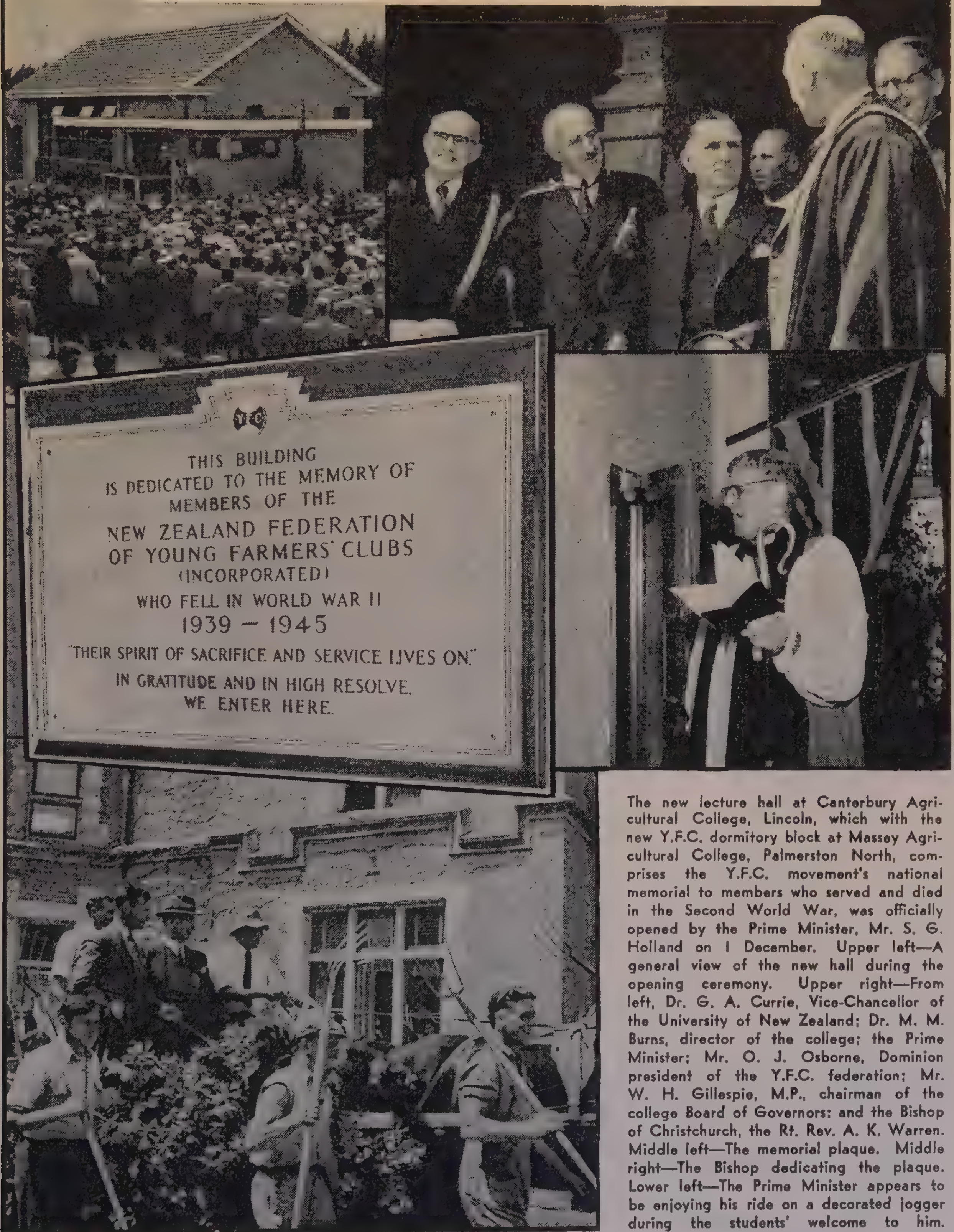
MAGGOT OIL
Clears maggots from wounds, assists in preventing restrike, promotes rapid healing and encourages regrowth of wool.

YOUNG'S- THE PEDIGREE DIP !

YOUNG'S SHEEP DIPS
JASON FINDS THE GOLDEN FLEECE

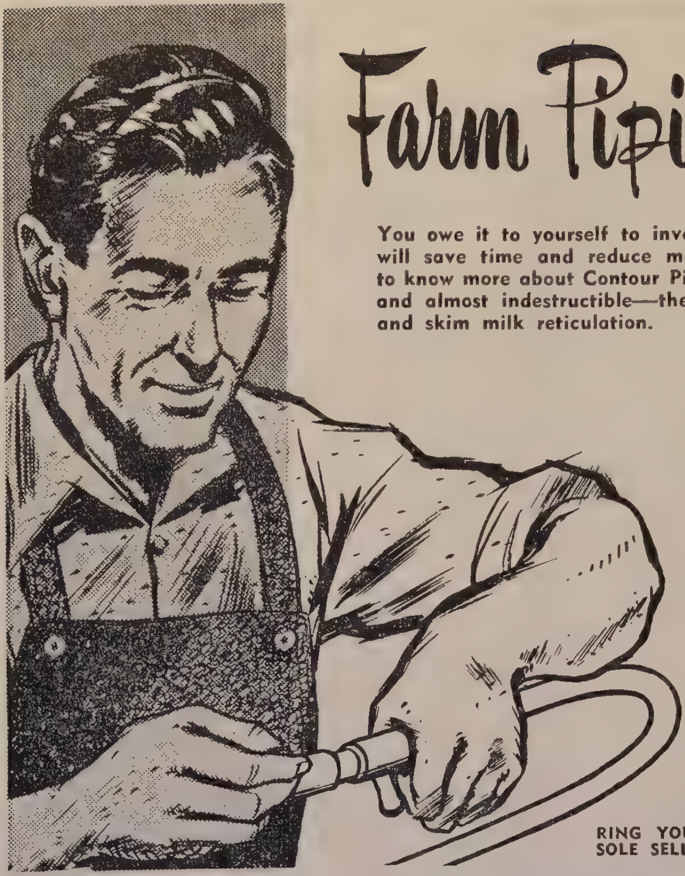
Consult your local Farmers' Co-operative Association or other appointed agent or write to N.Z. Agent:—
FARMERS' CO-OP. WHOLESALE FEDERATION (N.Z.) LTD., P.O. BOX 1124, WELLINGTON.

Y.F.C. MEMORIAL HALL OPENED AT LINCOLN



THIS BUILDING
IS DEDICATED TO THE MEMORY OF
MEMBERS OF THE
NEW ZEALAND FEDERATION
OF YOUNG FARMERS' CLUBS
(INCORPORATED)
WHO FELL IN WORLD WAR II
1939 — 1945
"THEIR SPIRIT OF SACRIFICE AND SERVICE LIVES ON."
IN GRATITUDE AND IN HIGH RESOLVE.
WE ENTER HERE.

The new lecture hall at Canterbury Agricultural College, Lincoln, which with the new Y.F.C. dormitory block at Massey Agricultural College, Palmerston North, comprises the Y.F.C. movement's national memorial to members who served and died in the Second World War, was officially opened by the Prime Minister, Mr. S. G. Holland on 1 December. Upper left—A general view of the new hall during the opening ceremony. Upper right—From left, Dr. G. A. Currie, Vice-Chancellor of the University of New Zealand; Dr. M. M. Burns, director of the college; the Prime Minister; Mr. O. J. Osborne, Dominion president of the Y.F.C. federation; Mr. W. H. Gillespie, M.P., chairman of the college Board of Governors; and the Bishop of Christchurch, the Rt. Rev. A. K. Warren. Middle left—The memorial plaque. Middle right—The Bishop dedicating the plaque. Lower left—The Prime Minister appears to be enjoying his ride on a decorated jogger during the students' welcome to him.



Farm Piping THE EASY WAY

You owe it to yourself to investigate any new development that will save time and reduce maintenance costs on a farm. Get to know more about Contour Pipe for instance. It's plastic, flexible and almost indestructible—the very latest development in water and skim milk reticulation.

Contour Pipe can be joined simply by butt welding from the heat of your blow lamp, threaded or adapted to take compression fittings for linking to existing runs. Due to ease of laying and unlimited life, installed cost is less than any other pipe. It can be laid at speed behind a mole plough or trenched in the normal manner. It comes in 50, 100, 200 and 500 foot coils.

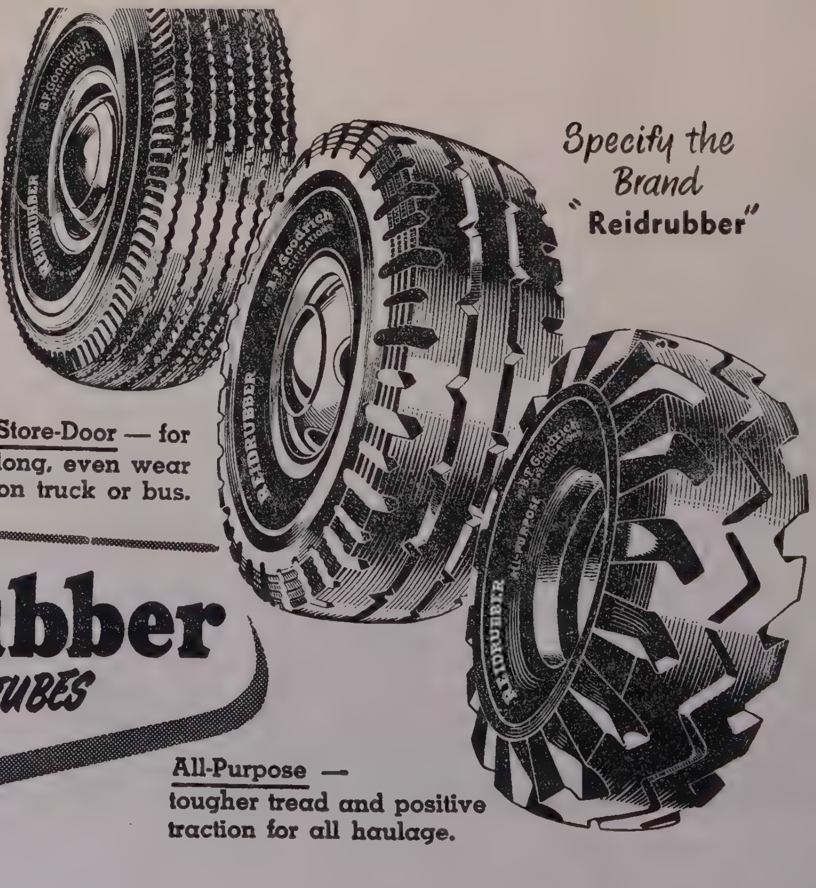
"GARNITE"

CONTOUR PIPE

registered trade name of the "Alkathene" Piping, manufactured by the PLASTICS DIVISION of the N.Z. GLASS MANUFACTURERS CO. PTY. LTD.

RING YOUR NEAREST STOCK & STATION AGENT OR WRITE TO SOLE SELLING AGENTS, NEILL, CROPPER & CO. LTD., Box No. 74, P.O., AUCKLAND.

Best by Test!



Specify the Brand **"Reidrubber"**

Car Tyre — for longer wear and silence with safety.

Store-Door — for long, even wear on truck or bus.

All-Purpose — tougher tread and positive traction for all haulage.

Reidrubber

TYRES AND TUBES

R.C.1

Preventing Outbreaks of Facial Eczema

By J. F. FILMER, Director, Animal Research Division, Department of Agriculture, Wellington

IF the hot weather which has been experienced this summer is followed by warm, showery weather, serious outbreaks of facial eczema may be expected in North Island districts unless precautions are taken to prevent them.

IT has been demonstrated quite conclusively that facial eczema is due to the development in the pasture of a substance which damages the liver. The skin lesions are due to phylloerythrin, a substance formed from chlorophyll, the colouring matter to which leaves owe their greenness. Normally phylloerythrin is eliminated by the liver, but in facial eczema the damaged liver is unable to do this. Phylloerythrin becomes concentrated in the blood, and renders the unpigmented skin sensitive to light, and lesions similar to those of sunburn occur.

It must always be remembered that it is the liver damage which is important, because unlike the skin lesions it cannot be cured, but must be prevented. This can be done only by reducing the consumption of toxic pasture to a minimum. To do this it is necessary to know what pastures are dangerous; to recognise the period during which they are dangerous; and to devise practical methods of preventing the different classes of stock from eating them.

What Pastures are Dangerous?

The most dangerous pastures are those of the highly productive perennial ryegrass-white clover type. Short-rotation ryegrass can be even more dangerous than perennial ryegrass if it is growing during a dangerous period. Hill pastures consisting largely of browntop, danthonia, and sweet vernal are relatively safe, but in many hill paddocks there are gullies containing ryegrass, and these are very dangerous.

The only pasture which has proved quite safe is the pure white clover sward which occurs in east coast districts in autumn, when short-rotation ryegrass dies during a dry summer.

Paspalum has a reputation for being safe, but a paspalum-ryegrass mixture can be dangerous. Irrigated pasture which has been growing right through the summer is usually safe unless it contains short-rotation ryegrass, when it can be very dangerous. In a bad year probably no mixed pasture is completely safe. The brassica crops rape, chou moellier, thousand-headed kale, and turnips are safe. Lucerne cannot be relied on, possibly because of the grasses frequently present as weeds.

Recognising the Dangerous Period

Any period of warm, showery weather between the beginning of February and the end of April may be dangerous. This is especially true if it induces the rapid growth of soft young grass. Departmental officers will issue warnings through the Press and over the radio when dangerous conditions occur in their districts, but they cannot keep track of all localised storms which may cause dangerous conditions in only small areas.

A typical case of facial eczema in sheep.

Farmers must be on the look-out for such conditions and must take precautions immediately. Such precautions must be taken before facial eczema occurs, as the liver is already damaged when the ears begin to swell.

Precautionary Measures

Facial eczema can be prevented only by ensuring that stock do not consume dangerous pastures during dangerous periods. Practical methods to ensure this vary with the class of stock.

Ewes and Other Mature Sheep

Hard hill country is usually fairly safe, but paddocks containing gullies with fresh green pasture must be avoided. Most farmers know from experience which paddocks are safest. It would not be wise this year to graze sheep after autumn rains in any paddock in which facial eczema has occurred since 1938. Unless crops of rape, chou moellier, thousand-headed kale, or turnips are available, the safest procedure is to concentrate sheep at a rate of not less than 100 per acre. On very good pasture an even higher rate may be needed. The grass should be eaten bare within 24 hours. Water must be provided, and if condition is to be maintained, ewes should receive about 2lb. of hay per head per day. Even if no hay is available, shutting up should be practised. Ewes quickly recover any condition which may be lost.

Facial eczema frequently occurs during the tupping period. Shutting up will reduce the number of twins, but it frequently results in the lambing being concentrated into a short period, and this produces quite a satisfactory lambing.

Lambs

Lambs should not be crowded together in the method recommended for ewes. Though quite effective in preventing facial eczema, this method checks the growth of lambs very badly and deaths may occur when they return to good pasture. Crops are the only satisfactory method of protecting lambs and should be used if they are available. If crops are not available, all killable lambs should be sent to the works promptly. The remainder should be turned on to the roughest feed available.

Cattle

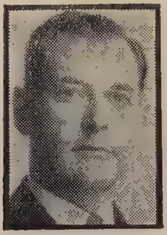
Fortunately cattle are not nearly as susceptible to facial eczema as sheep. However, dairy farmers who experienced the 1938 outbreak will know that they are by no means immune. Dairy cows can be protected by concentrating them in small areas with an electric fence at the rate of at least 40 cows per acre. They must be kept shut up and not turned on to fresh paddocks until the pasture becomes safe. Production can be maintained to some extent by feeding crops or silage. If these are not available, the farmer must decide whether to dry his cows off by shutting them up or take the risk of facial eczema. If the latter course is followed, the cows should be turned on to the most mature pasture available, and if this course is to be adopted, paddocks should be shut up at once and allowed to mature as much as the weather will permit.

When do Pastures Become Safe Again?

It is not usually very difficult to tell when pastures have become safe. Any change in the weather which hardens the feed makes it safe. Stock can usually be turned out safely after 3 or 4 days of hot, dry weather or after the same period of cold weather. Wind assists in hardening the feed in both hot and cold weather. Until the feed does harden, precautions must not be relaxed. It is not safe to turn stock out for an hour or two per day during dangerous periods.

The above precautions have been thoroughly tested at the Department of Agriculture's Ruakura Animal Research Station, where there has not been a single case of facial eczema since 1938 except in experimental sheep. Many farmers have been similarly successful. To be effective the precautions must be begun immediately the warm rains fall and they must be continued until the feed hardens.

Surpluses and Shortages in World Food



THE growing contribution New Zealand is making to world food supplies and the potentiality for still further increasing our output of primary products should make the people generally, and farmers in particular, especially interested in the Seventh Session of Conference of the Food and Agriculture Organization of the United Nations, which was held in Rome at the end of November to the middle of December last year. Delegations from over 60 member countries attended the conference, New Zealand's delegation being led by Mr. R. B. Tennent, Assistant Director-General of Agriculture.

In his paper on "The State of Food and Agriculture" the Director-General of FAO makes some interesting observations on the present supply and demand position of agricultural produce. In the 1952-53 season, for the first time since before the Second World War, total world food production caught up with the growth in world population. But the production estimates for the world as a whole give too favourable an impression, obscuring the fact that, because of great differences in production between regions and countries, people in many areas have still less than before the war, especially in the Far East, where production per head is 20 per cent. below the already insufficient pre-war per head level.

The magnitude of the food problem is brought out by the Director-General's statement. If allowance is made for quality as well as calorie content, the average per head diets of North America, Oceania, and Western Europe are something like two or three times those of most under-developed regions where nearly 70 per cent. of the world's population live. To raise their average diet to the present world average as a whole (which is by no means a high standard) would require an additional supply of food equal to the total 1952-53 production of North America and Oceania combined. More than 90 per cent. of this additional supply would be needed in the Far East.

Helping Under-developed Countries

International trade will, of course, be able to help some of the less fortunate countries to improve their position, but it has long been evident that if the under-developed countries want to raise their standard of living, they must raise the productivity of agriculture per man and per acre in their own territories. To do this is one of the objects of the Technical Assistance programme of the United Nations, which is carried out by the various specialised agencies. This exchange of know-how is something new in the field of international co-operation and I am pleased to say that New Zealand is playing its part in supplying experts to other countries, and a number of specialists from overseas have come here to study our methods. This scheme of assistance is in addition to that supplied by the Colombo Plan, to which New Zealand is also a contributor, and to the U.S. Point Four programme.

But shortages of food were not the only problem confronting the conference. Surpluses that had occurred in various regions also came up for discussion and means of disposing of these without interfering in international trade were considered.

In recent years there have been violent fluctuations in raw material prices, particularly of agricultural commodities. We in New Zealand have been affected by instability in the price of wool. But the fluctuations have had even more detrimental effects on some of the countries which are just beginning to put forward development projects and which rely on such produce as rubber, jute, and cotton for a large part of their overseas earnings. There, repercussions are not only economic but social and political, and the conference recognised the need for devising some scheme for evening out these fluctuations. Commodity agreements are a very good means of stabilising incomes and prices, and the gradual extension of agreements to cover more commodities was recommended.

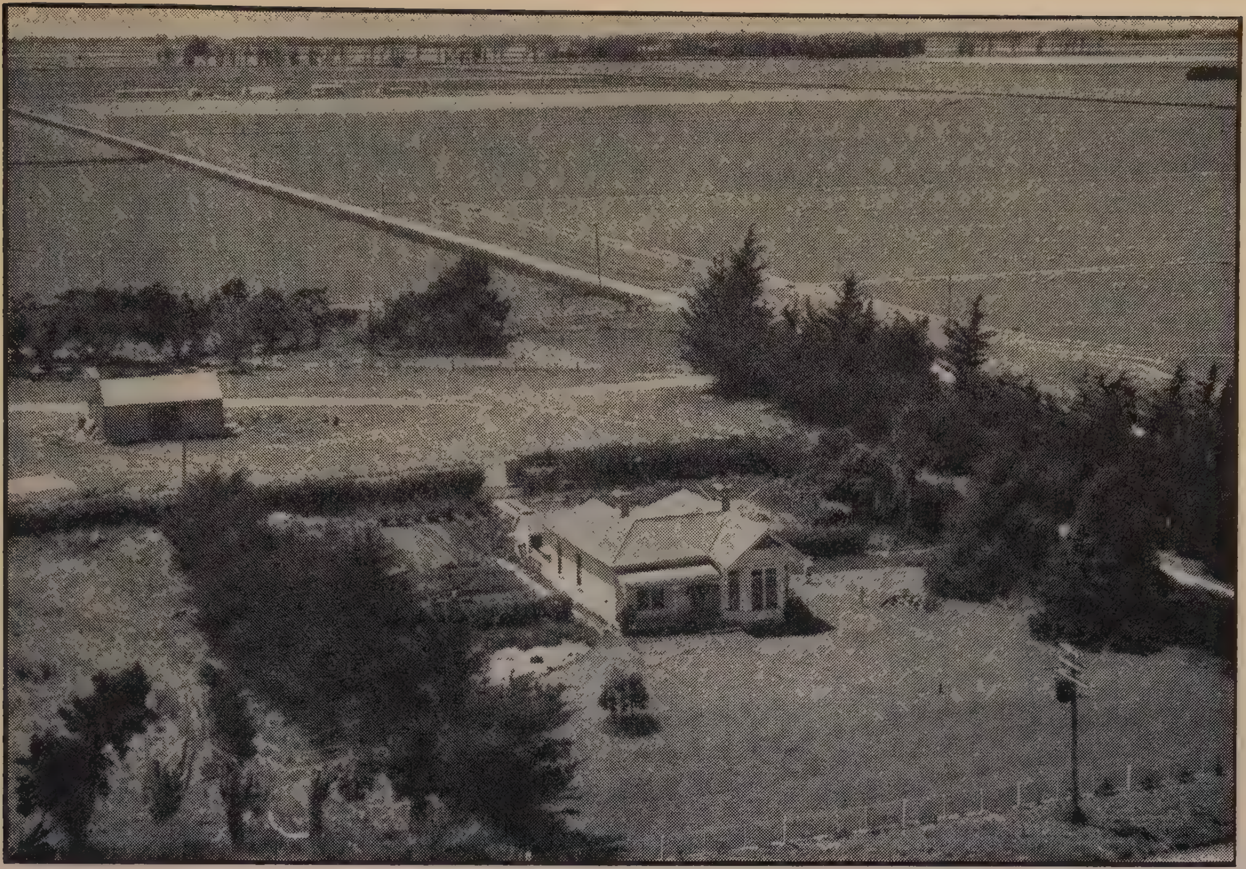
New Zealand took a prominent part in these discussions and was elected to the Committee on Commodity Problems which studies and reports on commodity conditions about twice a year. New Zealand was also appointed to the working party which will meet in Washington in February.

Two Major Problems

Two major problems still face agriculture. The first is how to find stable markets for the growing agricultural production, particularly how to find ways of distributing more of the increasing supplies of food in some areas to the under-nourished populations who have such great need of them. The second is how to raise most effectively agricultural productivity in the less developed countries to provide more adequate supplies of food to their people and a reasonable standard of life for their farmers.

I have on numerous occasions stressed the need for increased production in New Zealand and this still applies. The world's population is increasing rapidly and as the standard of living is raised both in already developed and in the under-developed countries markets will be extended and new ones created, especially in protein foods. But competition will be greater than since the war, both from increased production in other countries and from substitutes. There is room for optimism, but not for complacency; costs of production must be kept down and prices must be maintained at a reasonable level or we will price ourselves out of the market.

K. J. HOLYOAKE, Minister of Agriculture



HEADING PHOTOGRAPH: Part of Winchmore Irrigation Research Station with the homestead in the foreground. Auster Airviews photo.

Mixed Farming on Winchmore Irrigation Research Station

ABOUT 750,000 acres of light, shingly land in Canterbury is used for wool and fat lamb production with a limited amount of cash cropping. Under dry farming the land has a carrying capacity of from ¾ to 1½ breeding ewes per acre. This article by G. K. McPherson, Irrigation Research Officer, Department of Agriculture, Ashburton, describes how irrigation has been used on the Winchmore Irrigation Research Station to raise carrying capacity to 3 breeding ewes (and their replacements) per acre and to develop cash cropping.

THE Canterbury light land farmer relies mainly on lamb and wool to provide the major portion of farm income. Returns from these two sources are generally augmented by growing a cereal crop such as wheat or oats, and if conditions are suitable ryegrass seed or white clover seed may also be produced. A few farmers run beef cattle as well as sheep. Production from individual farms varies considerably, most farmers carrying perhaps ¾ to 1½ breeding ewes or their equivalent per acre and doing some cropping.

In recent years the use of subterranean clover in pasture mixtures and of lucerne for summer grazing has helped light land farmers to raise the carrying capacity and lengthen the life of their short-rotation pastures, but even so dry summer and autumn conditions have precluded development beyond a 1½- to 2-ewes-per-acre level. To investigate the value of irrigation in developing improved grassland farming and cropping methods 350 acres of the Winchmore Irrigation Research Station was set aside at the end of 1946 as a mixed sheep and cropping farm. As fully irrigated a farm as possible has now been established with 310 acres border diked.

Rotations

When the property was acquired it was in a rather low state of fertility, being dominantly browntop. In addition subdivision was inadequate for a small unit, the area of some paddocks exceeding 50 acres. At the start a 5-year development programme was laid down, the intention being that at the end of that period the whole farm would have been cleaned as far as circumstances would permit and grassed down for the first time. The programme thus envisaged the cleaning and sowing down to grass of approximately 70 acres each year. It was possible to adhere to the original programme in every respect. Some typical rotations in this 5-year cleaning programme were:—

Old pasture (original sward), lupins, rape, fallow, grass.

Old pasture (original sward), lupins, rape, wheat, fallow, grass.

Old pasture (original sward), turnips, rape, fallow, grass.

The above rotations provided for the growing of two successive fodder crops. This was considered essential to clean the land sufficiently of run-out pasture before sowing down to grass, and at the same time it provided lamb-fattening feed and winter feed for the ewes.

Subsequent Rotations

It has been the policy on the property to grow wheat and it was also considered desirable to continue to grow lamb-fattening feed and winter feed for the ewes. Before the completion of the 5-year programme it was therefore necessary to bring a new rotation into operation by ploughing up each year one of the original paddocks sown down to grass. The rotation practised here has been as follows: Out of grass, turnips, rape, wheat, greenfeed, grass.

Irrigating border diked pasture at Winchmore.

This rotation worked very well, but because of the increasing number of stock being carried it has been necessary to increase the area of turnips and of lucerne for winter feed. Since 1951 1½ paddocks have been ploughed out of grass each year; the complete paddock has been cropped on the standard rotation and the half paddock has been sown to lucerne.

No data are yet available on the optimum life of a pasture under irrigation. Whatever decision is reached a suitable rotation can at any time be introduced to meet the position.

Subdivision

Subdivision has proceeded with the development of the farm. When the property was acquired fencing consisted of 427 chains of gorse fence and 92 chains of steel standard and wire fence. By the end of June 1953 a further 466 chains of permanent fencing had been erected, and when fencing is completed there will be 22 paddocks each of about 16 acres. Where possible, lanes have been provided to facilitate shifting of stock.

Shelter

A programme of planting of shelter belts which began with the development of the farm is now almost completed. Along most of the boundary fences pines have been planted, and internal shelter belts contain macrocarpa, lawsoniana, cedars, poplars, oregon pines, and various species of gums.

Preparation for Irrigation

When development of the farm was begun one of the major decisions made was to border dike the whole farm for irrigation. Border diking was begun in February 1947 and completed in October 1949. Water can be diverted to wherever it is considered most necessary or desirable. The programme of border diking was as follows:—

	Acres	
February 1947	48	
October 1947	10	
December 1947	48	
	—	106
May 1948	70	
October 1948	96	
	—	166
October 1949	38	
	—	38
Total		310

This rapid development for irrigation enabled cleaning crops such as rape and turnips to be irrigated whenever it was considered advisable.

Pasture Mixtures

Perennial ryegrass and white clover have formed the basis of all pasture mixtures. Where the intention has been to harvest ryegrass or clover for seed these two species and crested dogstail and subterranean clover have been sown. For pasture intended for grazing only Montgomery red clover has been included with the other species. Subterranean clover under irrigation has produced very little feed and its inclusion in the seed mixture does not seem justified.

Details of the mixtures sown have been as follows:—

For Grazing and Seed Production

	lb. per acre
Perennial ryegrass	30
Crested dogstail	2
White clover	2
Subterranean clover	3
Total	37

For Grazing Only

	lb. per acre
Perennial ryegrass	30
Crested dogstail	2
White clover	2
Montgomery red clover ..	3
Subterranean clover	3
Total	40

Liming and Topdressing

Some liming has been done each year and now the whole farm has received 1 ton of lime per acre. Superphosphate is applied to grass paddocks at 2cwt. per acre each year, some of the fertiliser being applied in autumn and some in spring. As both grass-grub and grass caterpillar (porina) can damage irrigated pastures extensively, it is intended in future to treat approximately one-third of the grass area of the farm with D.D.T. superphosphate each year.

Stock

The major products from the farm are lamb and wool. The aim therefore has been to build up the ewe flock as quickly as feed conditions would permit. For a time it was necessary to purchase replacements, but the position has now been reached where sufficient replacement stock are being bred on the farm. Further, the flock is gradually reaching the stage when it will consist of almost equal numbers of 2-, 4-, 6-, and 8-tooth ewes. The following table shows the increases in stock numbers which have taken place over the years:—

Year	Ewes wintered	Ewe hoggets bred and wintered
1947-48	399	—
1948-49	500	—
1949-50	623	123
1950-51	755	150
1951-52	968	247
1952-53	1,038	*354
1953-54	1,048	324

* Includes 88 ewe hoggets purchased.

Stocking for the winter of the 1953-54 season also included 20 steer calves. The ultimate carrying capacity is difficult to estimate, but as the pastures are still capable of substantial improvement, it seems reasonable to assume that the number of stock could be increased substantially. The most popular class of ewe on the light land of Canterbury is the half-bred. This type of ewe appears to be very suitable for the dry conditions and it also produces a good fat lamb and clips a good-quality fleece.

With the introduction of irrigation on the farm and the production of feed more typical of that on high-rainfall areas it was considered that a coarse-woolled ewe was desirable. It was therefore decided to aim at a ewe flock of a Romney type. Since 1949 the finer-woolled ewes in the flock have been mated with Romney rams and the ewe lambs from this mating have been retained for flock replacements.

Management of Flock

The management of the ewe flock has been more or less similar to that on dry land farms. After lambs have been weaned about the first week in January the ewes are placed on fairly bare pastures to prevent them from becoming too fat. In early March they are flushed and the rams are put out (about 1 ram to 40 ewes) so that lambing begins about the middle of August. About two-thirds of the flock are mated to Romney rams to provide sufficient ewe lambs for flock replacements; the balance of the ewes go to Southdown rams.

When the rams are removed all the ewes are boxed for easy handling during wintering.

Lambs yarded for drafting. At Winchmore lambs have not fattened as rapidly as they do under dry land farming, but with irrigation grass growth has been maintained throughout autumn and lambs have reached relatively good weights.

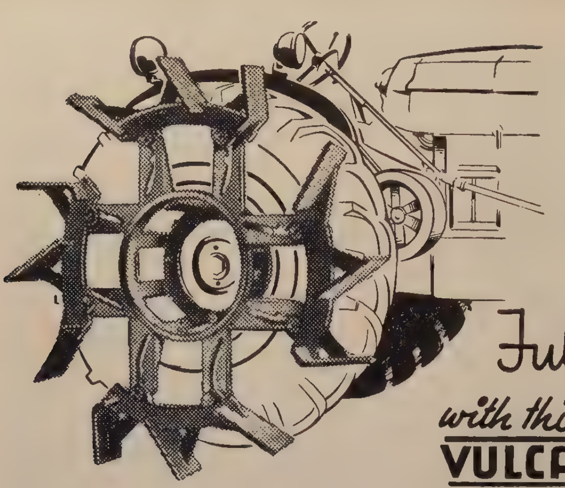
Throughout June, July, and August the ewes are on turnips for about 2 hours per day and they also receive 1 bale of hay per day for every 100 ewes. Set stocking of ewes and lambs was not practised until the 1952-53 season. After lambing, the flock has usually been split into three mobs, each of which has been rotated around three or four paddocks. No rigid system of grazing in relation to time of irrigation has been followed. Sometimes a fortnight or more has elapsed between irrigation and grazing of a paddock. At other times irrigation has proceeded with the ewes and lambs in the paddock. From the time areas have been closed for grass and clover seed until lambs have been weaned the stocking rate has approximated 5 ewes and their lambs per acre plus dry stock.

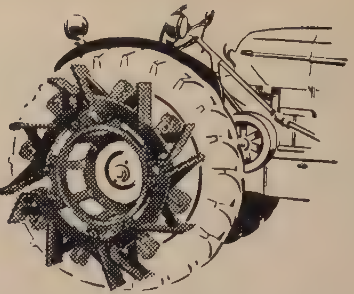
Generally the health of ewes has been quite good. The main losses have invariably occurred in August just before lambing and the spring flush of grass. The following table shows the ewe losses over the past 6 years:—

Year	Ewes to ram	Deaths	Percentage of deaths
1947-48	399	19	4.7
1948-49	500	23	4.6
1949-50	623	40	6.4
1950-51	755	25	3.3
1951-52	968	43	4.4
1952-53	1,038	37	3.5

The majority of the deaths were due no doubt to sleepy sickness or milk fever. Cases of scald and foot-rot have occurred, but at no time has either disease been a problem.

Breeding ewes being wintered on turnips. About 1 acre of turnips is grown for every 60 sheep wintered.





Gripper Retracted For Road Use.

Full tractor power in heavy going with this VULCAN RETRACTABLE GRIPPER

Gripper Expanded Ready For Hard Work.

Dunn's patent Nos. 91473 and 96873

N.Z.'s MOST EFFICIENT GRIPPER!

Maximum tractor power in heaviest conditions. Permanently bolted to wheels, fits all modern tractors. Unique paddle-action blades ensure firm grip, clean withdrawal.

Blades are extended or retracted quickly, simply—with two intermediate positions for varying conditions. All-steel construction, **NO** moving parts to bend or break.

ORDER NOW FOR FORWARD DELIVERY

Enquire From Your Mercantile, Stock & Station, or Tractor Agent.

Manufactured by J. Johnston & Sons Ltd., Manufacturers and Engineers, INVERCARGILL.

Send for FREE FOLDER

Messrs. J. Johnston & Sons Ltd.,
Manufacturers & Engineers, P.O. Box 47,
Invercargill.

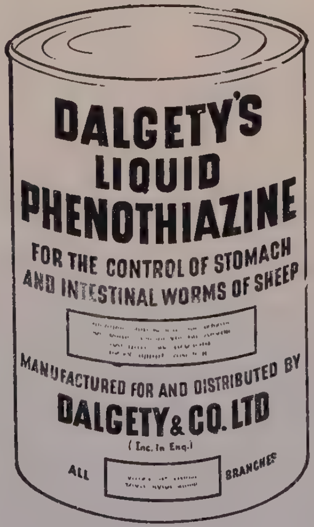
Dear Sirs,
Please send **FREE** folder giving details of Vulcan Retractable Gripper.

NAME ....
(Block Letters)

ADDRESS ....

.... J.A.

(State make and model of Tractor and tyre size.)


DALGETY'S
LIQUID
PHENOTHIAZINE
FOR THE CONTROL OF STOMACH AND INTESTINAL WORMS OF SHEEP
MANUFACTURED FOR AND DISTRIBUTED BY
DALGETY & CO. LTD
(Inc. in Eng.)
ALL BRANCHES

If the PROBLEM is stomach worms of sheep— The ANSWER is Dalgety's Liquid Ready-mixed Phenothiazine !

Always SAFE and EFFECTIVE! Gives EVEN doses . . . stays in suspension and does not cake (one stirring lasts ALL DAY). For use with any standard Phenothiazine Pistolet or automatic gun. Also available in tablets or powder. Get your supply NOW !

Enquire from —

DALGETY & Co., Ltd.

— All Branches

Lambing

Lambing percentages generally have not been high. The following table shows the percentage of lambs tailed and also lamb deaths after tailing:—

Year	Ewes to ram	Lambs tailed	Lambing percentage	Lamb deaths after tailing	Percentage of lamb deaths
1947-48	399	344	86	12	3.4
1948-49	500	622	124	8	1.3
1949-50	623	702	112	7	1.1
1950-51	755	846	112	29	3.4
1951-52	968	1,024	106	42	4.1
1952-53	1,038	1,058	102	54	5.1

Lambs that have died after tailing have been mainly big lambs. Pulpy kidney was the probable cause of losses.

Sale of Lambs

Generally lambs have not fattened as rapidly as they do under dry land farming. Nevertheless, it has been possible with irrigation to maintain grass growth throughout autumn and to attain relatively good weights as the following table shows:—

Year	No. of lambs sold	Percentage fat off mothers	Average weight lb.	Ewe lambs retained	Cull lambs
1947-48	326	Nil	36.2	—	7
1948-49	492	12	38.2	130	—
1949-50	548	53	36.75	150	—
1950-51	544	14	38.84	247	26
1951-52	688	Nil	36.52	270	24
1952-53	648	19	35.0	324	26

The percentage of lambs drafted fat off the mothers is relatively small. This percentage could have been increased, but at the expense of the final average weights.

In addition to grass a crop of rape has been grown each year. With irrigation the crops generally have been good and have provided useful feed for the lambs.

Wool

The time of shearing has varied between November and January, but pre-lambing shearing has not been practised. The following table gives details of the total wool produced per ewe and per acre during the past 6 seasons:—

Season	Weight of fleece per ewe lb.	Total wool per acre lb.
1947-48 ..	*11.8	13.5
1948-49 ..	9.8	16.5
1949-50 ..	10.2	23.8
1950-51 ..	8.7	28.0
1951-52 ..	9.7	40.5
1952-53 ..	9.8	39.1

* All 2-tooth ewes and probably represents 14 months' growth.

The ewe lambs retained for flock replacement are shorn in January and again as hoggets at the main shearing. During the past two seasons some rape lambs have also been shorn. There is no evidence that grazing on irrigated pastures has reduced the weight of wool, nor does it appear to have impaired wool quality.

Winter Feed

In the initial stages of the development of the farm winter feed consisted of turnips, lupins, and hay. Lupins have now been dispensed with and turnips and hay provide the winter feed for the ewe flock and hoggets. About 1 acre of turnips is grown for every 60 sheep wintered. During the early part of winter an area intended for turnips is used as a run-off from the previous crop and the resultant build-up in fertility and the use of irrigation practically assure a reasonably good crop.

Hay requirements for winter are based on 1½ to 2 bales per sheep, and during the past 4 years a 21-acre stand of lucerne has provided the major portion of this hay. The lucerne produced well for the first 2 years, but in the third year became badly infested with browntop and new areas will have to be sown.

Irrigation

The aim in irrigating the farm has been to restrict the amount of water used to not more than 1 acre-foot over the whole property, though this amount was exceeded in the 1949-50 and 1951-52 seasons. The amount of water used and the hours of work occupied in applying it have been as follows:—

Season	Average amount of water used per acre over whole farm acre-in.	Time occupied in applying water hours
1947-48 ..	5.2	220
1948-49 ..	11.2	387
1949-50 ..	15.2	677
1950-51 ..	8.55	339
1951-52 ..	15.3	738
1952-53 ..	6.6	299

The bulk of the water has been used on pastures and lucerne, but where necessary crops such as turnips, rape, and wheat have received water.

Labour Involved in Irrigating

Irrespective of the quantity of water available the time taken to irrigate 1 acre has varied tremendously. On pastures the fall of the land, the length of growth, and the moisture content of the soil were perhaps the main factors influencing the rate of irrigation. If there was considerable top growth or if the soil was very dry, the speed with which water could be applied was very much reduced. In some circumstances it was possible to irrigate 3 acres of pasture per hour and in other cases the rate of irrigating was reduced to 1 acre per hour.

With lucerne, with crops such as wheat, rape, and turnips, or with cultivated ground the rate of watering was generally much slower than with pasture. When lucerne became very rank a rate of watering of 1 acre per hour could not be attained.

In the 1951-52 season, the late summer and autumn of which were

Direct heading of wheat on border diked land.

Water!

Water!

Water!

Water is the life-blood of every farm. Often its importance is not realised until too late; even today, some farmers do not take action until a dry season or a serious breakdown has crippled production or caused serious stock losses.

The problem of ample water-supply is a job best left for the experts. And Wallaces *are* the experts, with years of practical experience in every district, on every type of country. This advisory service is yours for the asking, without obligation. Consult your local Wallace representative now regarding your particular water-supply problem.

D. McL. Wallace LTD.

NEWMARKET. Phone 30-155.

Branches at:

Hamilton	Phone	1574
Te Aroha	Phone	38
Thames	Phone	210
Matamata	Phone	547
Whakatane	Phone	765M
Whangarei	Phone	2653
Dargaville	Phone	137
Stratford	Phone	384
New Plymouth.	Phone	5975

Representatives at Kaitaia, Tuakau and Palmerston North. SOUTH ISLAND: Messrs. T. H. Phipps and Son, Christchurch.

Cut Farm Maintenance Costs

Safeguard your farm property with low-cost Duroid protection. There's a Duroid product to weatherproof, rustproof or seal every nook and cranny or exposed surface on all farm buildings and farm machinery of every description.

- DUROID ROLL ROOFING for all farm buildings.
- DUROLAC BLACK BITUMINOUS PAINT for buildings, tents, rails, machinery, etc.
- DUROLAC SILVER for asbestos, metal or roofing.
- HYDROSEAL to stop leaks — permanently — quickly.
- DUROID ROOF COATING to preserve fabric roofs and Duroid Fibre Roof Coating for a heavier protective coat.
- DUROID ADHESIVE for roof laying.

Sold by Builders' suppliers, hardware stores, stock and station agents.

DUROID *Products*

N.Z. Agents: DOMINION SALES CORPORATION LTD., Auckland (Box 269), Wellington (Box 2052), Christchurch (Box 1168), Dunedin (Box 915). Manufactured by Duroid Products (N.Z.) Ltd., Onehunga and Dunedin.

DG.1

particularly dry, a total of 738 hours was spent in applying water to 1132 acres of lucerne, crop, and pasture, an average per hour of 1.5 acres. The labour was distributed as follows:—

	Time to irrigate hours	Average per hour acres
199 acres of lucerne, wheat, rape, and turnips	231	0.9
933 acres of pasture	507	1.8

For most of this irrigating season 8 cusecs of water was available. Only at times was the flow reduced to 4 or 6 cusecs.

Watering not only occupies a relatively large number of hours, but is often necessary when other essential farm work such as shearing and harvesting needs to be done. The only solution appears to be a system of automatic irrigation. This is being investigated on the research area.

Wheat

It has been the policy on the farm to grow wheat, the present rotation allowing for one paddock (about a twentieth of the farm) to be sown in wheat each year. Yields have shown a gradual increase from 25 bushels per acre in 1948-49 to 42 bushels per acre in 1951-52. For the 1952-53 season the yield was 13 bushels per acre, but this was an abnormal wheat year, particularly for Cross 7 wheat. There seems little doubt that the build-up in fertility created by the additional stock being carried has had a substantial influence on the yield of wheat. Cross 7 has been the only variety grown.

Small Seeds

A feature of the operations on the farm is the production of small seeds. Perennial ryegrass, crested dogstail, and white clover have been harvested as opportunity permitted. Yields of perennial ryegrass seed, even with irrigation, have not exceeded 20 bushels of machine-dressed seed per acre. Such a yield is not particularly encouraging and it is evident that the fertility of the soil in the paddocks harvested for seed so far has not been high enough. However, with the build-up in soil fertility which is gradually taking place it is reasonable to expect much better yields of seed in future.

Crested dogstail has not been harvested as a crop, but useful returns have been obtained from seed harvested with either perennial ryegrass or white clover. The production of white clover seed under irrigation has shown considerable promise. With as few as two or three irrigations after closing it has been possible to obtain up to 160lb. of machine-dressed seed per acre. It appears that with irrigation yields comparable with those obtained on heavy land are possible.

Labour

The labour on the farm has consisted of the manager and a tractor driver. Casual labour equivalent to approximately one man for half of the year has also been available. This gives a total labour force of 2½ units. When the property is fully developed and all permanent fencing is erected it should be possible to dispense with the casual labour, particularly if some system of automatic irrigation can be introduced.

Wheat stubble and broad red clover which was drilled in spring during harrowing of the wheat. After the wheat was harvested the paddock provided good lamb-fattening feed; it was useful for lambs and ewes in the following spring.

There is a full set of cultivation implements, a pick-up hay baler, and a header harvester.

Cost of Development

When the farm was taken over by the Department of Agriculture in September 1946 buildings consisted of a house, a combined grain, manure, and implement shed, and several small sheds of a total value of £2653. Other improvements were fences £279 and plantations £50. A cottage, a woolshed, sheep yards, and a spray dip have since been constructed, 466 chains of permanent fences have been erected, a domestic and stock water supply has been installed, and a considerable number of shelter belts have been planted.

Preparation of the whole farm for irrigation has included the installation of head-gate blocks, junction blocks, grills, and culverts where necessary. The whole of the area border diked has been limed and sown in a permanent pasture mixture. Development costs to the end of June 1953 (figures include value of improvements when property was acquired) have been as follows:—

	Total cost			Cost per acre		
	£	s.	d.	£	s.	d.
Buildings (house, cottage, grain, manure, and implement shed, and woolshed)	5,006	3	9	14	6	0
Fencing (558 chains permanent fencing)	2,169	18	4	6	4	0
Irrigation development (bordering of land and installation of head-gate, junction blocks, and culverts for 310 acres) ..	1,774	16	2	5	14	6
Roadways	58	14	4		3	4
Pastures (cost of cultivation, liming, manuring, sowing, and seed mixtures for 310 acres to permanent grass)	2,469	14	11	7	19	4
Sheep yards and spray dip	419	10	4	1	4	0
Shelter belts	330	4	8		18	10
Water supply (stock and domestic)	130	8	6		7	5
	12,359	11	0	36	17	5

At the time the property was bought the land alone was valued at £7 12s. 4d. per acre. The total value of land plus cost of improvements at the end of June 1953 was £44 9s. 9d. per acre.

Seasonal Operations 1952-53

Apart from the work involved in irrigating both pastures and crops, seasonal operations are much the same as those carried out by farmers on similar land without irrigation. In June 1952 the farm position was as follows:—

	Acres
Permanent pasture	250
Wheat	16
Turnips	24
Lucerne	21
Greenfeed	16
Shelter belts, roading, and buildings	23
	350

Cultivation

Cultivation for 1952-53 covered 96 acres comprising permanent grass, turnips, wheat, rape, greenfeed, and lucerne.

Permanent pasture (16 acres): The greenfeed paddock (broad red clover) was hustled twice in December, deep ploughed in January, and sown down to permanent grass in February. As the area may eventually be harvested for seed, the seed mixture was restricted to perennial ryegrass, crested dogstail, and white clover.

Greenfeed (16 acres): Greenfeed was provided by drilling 5lb. per acre of broad red clover in the wheat crop in September. After the wheat was harvested the paddock provided good lamb-fattening feed in the autumn and also a useful paddock for ewes and lambs in the following spring.

Turnips (24 acres): Turnips follow grass in the rotation. In August the paddocks received three strokes with a hustler with narrow grass tines. They were then deep ploughed and rolled on the furrow. Sixteen acres were sown in December and 8 acres in January. The varieties sown were York Globe and Green Globe.

Rape (16 acres): Feeding off of the turnip crop from the previous season was completed in August. The land was then grubbed and ploughed about 5in. deep early in September and rape was sown in mid-November. Owing to excessive rain the strike was poor and the area was resown in December. The club root resistant variety was used.

Lucerne (8 acres): Lucerne follows turnips. The area was cultivated throughout the late spring and summer and the lucerne drilled during February.

Wheat (16 acres): Wheat follows rape. The rape stubble was ploughed early in May and the wheat, Cross 7, drilled toward the end of the month.

Small Seeds

Thirty-two acres were closed for white clover seed, but owing to the continuous wet conditions the area was eventually cut for hay.

Superphosphate and Lime

Superphosphate and lime used during the year were as follows:—

	Tons
Superphosphate for topdressing and sowing of 96 acres of new grass crop and greenfeed	9
D.D.T. superphosphate for sowing 160 acres of permanent pasture	11
Nitro-lime for sowing on 21 acres of lucerne and 16 acres of pasture	2
Lime for sowing on 65 acres of permanent pasture and 8 acres of lucerne	71

The lime was applied in winter, the nitro-lime in September, and the D.D.T. superphosphate in October and March.

Hay

The lucerne stand provided 1910 bales of hay in three cuts. The first cut was completely ruined as a result of continuous wet weather. Forty-eight acres of pasture was also cut for hay and this yielded 2250 bales. In addition 663 bales of hay were purchased.

Stock

At the beginning of the year there were 1038 breeding ewes. Of these 240 were sold as cull ewes, 84 as fats, and there were 37 deaths. In the autumn 24 2-tooth ewes were purchased. Of the 354 ewe hoggets wintered, 7 died, the remainder being transferred to the ewe flock as 2-tooths in the autumn. Ewe lambs on hand at the end of June 1953 for flock replacement were 324. During the year 6 old rams were killed and 4 2-tooth rams purchased. Twenty steer calves were purchased in the autumn.

Irrigation

Because of the abnormally wet season the irrigation of pastures and crops was very much restricted. Irrigation was started in September and finished in March, a total of 2316 acre-inches of water being used, which represents approximately 7.4in. per acre over the bordered area (310 acres) of the farm. The total area irrigated during the season was 558 acres, which means that the average number of applications was slightly less than two and the average amount of water applied at each irrigation approximated 4.2in. A total of 299 hours was spent in irrigating, giving a watering rate of 1.8 acres per hour.

Farm Production

A total of 648 fat lambs was sold; also 26 cull lambs. In addition 324 ewe lambs were retained for flock replacement. Wool sold totalled 13,694lb. Surplus stock sold consisted of 240 cull ewes and 84 fat ewes. Sixteen acres of Cross 7 wheat yielded 208 bushels, or 13 bushels per acre. No white clover seed or perennial ryegrass seed was harvested.

Farm Account

During the first few years of development, the accounts showed a loss, but this position has been reversed and an accumulated fund of £2608 has been built up out of profits. The farm accounts for the 1952-53 season are summarised below:—

Livestock Account

	Debit £	Credit £
Stock on hand (at standard values) .	2,755	
Purchases	597	
Sales		2,594
Stock on hand (at standard values) .		2,865
Profit on livestock ..	2,107	
	5,459	5,459

Working Account

	Debit £	Credit £
Wages	1,342	
Lime, seeds, manure ..	635	
Vehicle and implement running and hire costs	432	
Harvesting, baling, and purchase of hay ..	403	
Sundry expenses ..	402	
Net cost of general farm stores ..	103	
Irrigation water charges	34	
Sales of wool, seeds, wheat		2,678
Profit on livestock .		2,107
Gross working profit .	1,434	
	4,785	4,785

Profit and Loss Account

	Debit £	Credit £
Gross working profit		1,434
Depreciation	314	
Interest on capital ..	587	
Net profit	533	
	1,434	1,434

The above returns were obtained in a season when the wheat crop was almost a failure and no small seeds were harvested. The farming position must therefore be considered as satisfactory, as the farm supports two families and has paid £1342 in wages.

Conclusion

In 1947 when the property was taken over the carrying capacity was about 1 ewe per acre. Today the farm is carrying 3 ewes per acre plus replacements and 20 yearling steers. This increase in stock numbers has taken place on the initial pastures sown after browntop. The pastures are still capable of considerable improvement.

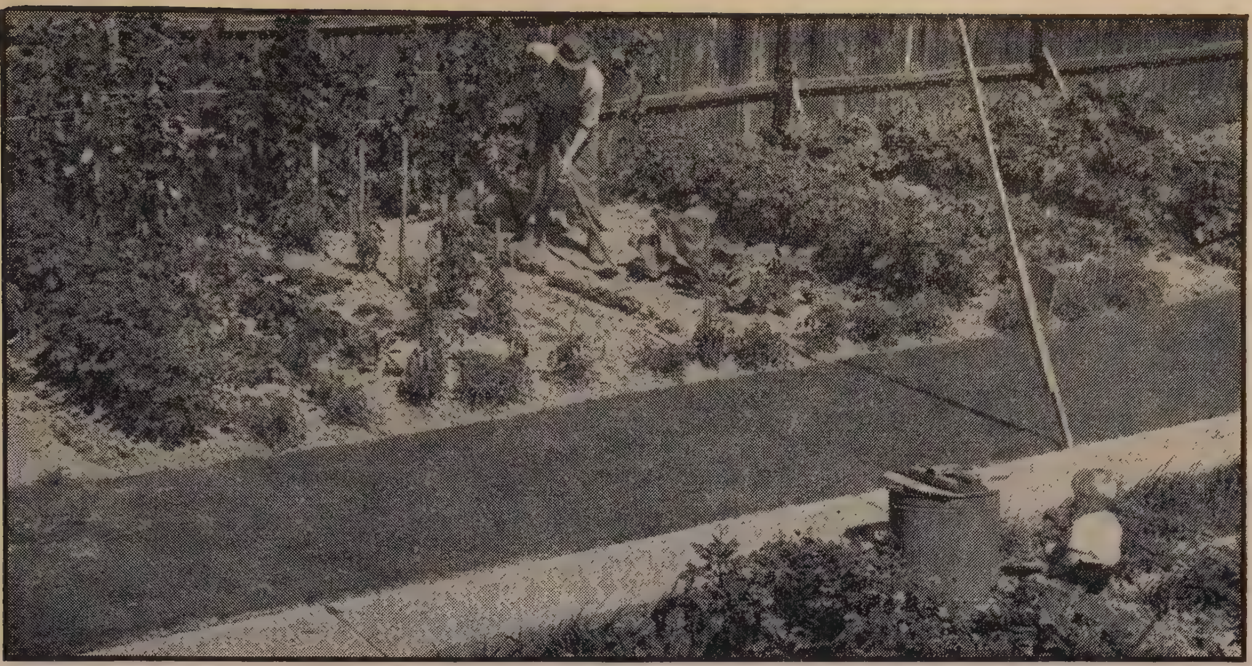
With the gradual renewal of the original pastures, with the use of more fertiliser and lime, and with the development of automatic irrigation a substantial further increase in production can be expected. Irrigation involves many additional costs, perhaps the major ones being the preparation of the land for irrigation, subdivision, and cost of applying the water. The evidence from this farm suggests that the revenue obtained has justified the expenditure on irrigation.

Grass-grub and Porina Control

BOTH grass-grub and porina (*Oxycanus*) in pastures can be controlled by applications of 2lb. of 100 per cent. para para isomer D.D.T. per acre or its equivalent at lower percentages (4lb. of 50 per cent. p.p.i. or 8lb. of 25 per cent. p.p.i.). This dosage will remain effective for 3 years. The insecticide should be applied preferably in the normal dressing of superphosphate or can be mixed with up to 2cwt. of lime per acre. In the latter case care should be taken that the mix is not kept in storage for any great time, as the effectiveness of the D.D.T. may be impaired. Pastures should be dry and closely grazed before the treatment is applied, as to be effective the D.D.T. must reach the surface of the soil. Where this is not possible all stock should be kept off the area until a heavy rain—at least ½in.—washes the insecticide on to the ground. Because bees are susceptible to D.D.T., care should be taken not to apply this while clovers are in flower. The period during which there is most danger of mortality to bees ranges from September to March inclusive. Apart from the loss of honey to the apiarists, the non-pollination of the clover may seriously affect the natural reseeding in the pasture and reduce clover seed crops.

Applications are best made in early spring when grass growth begins; or in late summer or early autumn as an insurance against damage where attacks can be expected; or as soon as damage is observed. The treatment is not expected to kill **all** the grubs or caterpillars, but to reduce the damage to the stage where a good pasture can be maintained.

—R. INCH,
Fields Instructor,
Department of Agriculture,
Ashburton



Reasons for Common Home Garden Failures

GROWING vegetables in the home garden has always been popular in New Zealand and received a stimulus during the war, when commercially grown crops were insufficient to supply all needs. Since then many thousands of houses have been erected and it is safe to say that the area under cultivation for vegetables in home gardens has reached the highest level in the history of New Zealand and is undoubtedly an important factor in the internal economy. Unfortunately the home gardener is periodically discouraged by crop failures and at times is strongly tempted to reduce the garden area. There is always a reason for crop failure, though sometimes it is rather hard to determine. In the first part of this article D. W. McCallum, Horticultural Instructor, Department of Agriculture, Blenheim, describes some of the frequent causes of failure. The section on routine work is by S. O. Gillard, Horticultural Instructor, Department of Agriculture, Auckland.

THE following are the principal factors in the production of vegetables:—

1. Seed.
2. Suitable variety.
3. Good cultural practices.
4. Disease and pest control.
5. Harvesting.
6. Storing.

All the above points have been dealt with in detail in the "Journal" over the past year or so and it is proposed to deal here with the results of variations from recommended practices.

Seed

Seed is the basis of the crop and as its cost is slight compared with the ultimate value of produce harvested, the best available should be used. Many gardeners tend to blame the seed for poor crops or bad germination, but seed should rarely cause failures provided it is obtained from a reputable seed merchant.

Surplus seed should not be kept from season to season. This applies especially to parsnip or onion seed, which loses its germinating ability rapidly. Seed of some vegetables may be saved in the home garden, but cross-pollinating difficulties could occur if the practice became widespread. Fresh seed obtained from a reputable merchant is undoubtedly a worthwhile insurance against crop failure.

Varieties

In districts where the winters are not particularly severe the varieties grown may be different from those grown in cold areas. For example Golden Acre or Hendersons Succession cabbages grow well in winter in Northland and Auckland, but in colder districts would make little or no growth in winter and in spring would probably go straight to seed. On the other hand the wrinkled savoy type of cabbage does not develop its full flavour until it has been frosted a few times and this type of cabbage is more suitable for the colder districts.

Lettuce is another species where varieties are important; Great Lakes and Imperial 847 are varieties which have been bred to withstand hot, dry summers and Imperial 615 to resist the cold, damp conditions of winter. Though Imperial 615 will grow quite well in summer, the converse does not apply and Great Lakes and Imperial 847 are not likely to thrive if grown in winter. On the other hand Webbs Wonderful seems quite well adapted to a variety of climatic conditions, though Imperial 615 will stand more adverse winter conditions.

Cultural Practices

Cultural practices cover a very wide range of activities, which may be considered under the following headings:—

Seed-beds

Every horticultural publication emphasises the need for thorough preparation of seed-beds and there is no doubt that a well-prepared bed will produce a far better stand of seedlings than will hard ground which has not been worked up or, conversely, land which has been dug over but not allowed to settle.

Temperature is important in seed germination and results are bound to be disappointing if the soil is cold and wet. Too thick a sowing also will bring troubles, as the air circulation around the bases of plants is restricted and if humid conditions occur, fungous diseases are almost certain to follow.

Most seed packets give directions as to depth of sowing. If the soil is heavy, too deep a sowing will inhibit germination, and in light soils shallow sowing may be the cause of germination failure if conditions become dry. Most small seeds will tolerate a covering of ½in. of fairly fine soil and the larger seeds such as peas and beans

---

HEADING PHOTOGRAPH: Constant attention to details will ensure success. Green and Hahn photo.

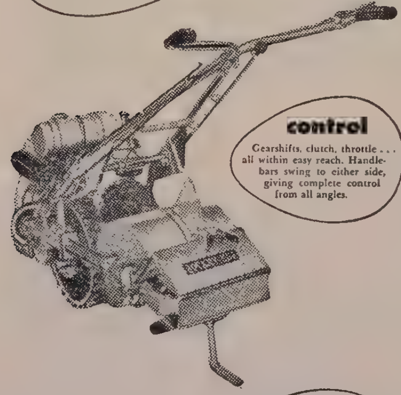
ROTAVATOR

Bantam

rules the roost with all these worksaving economy-planned features!

power

Power to spare in Bantam's sturdy motor. Starts fast by pulley and lanyard. Low petrol consumption gives *economy!*



control

Gearshifts, clutch, throttle . . . all within easy reach. Handlebars swing to either side, giving complete control from all angles.

7"-8" depth

The self-sharpening blades adjust in ½-inch stages. Working width of 10 inches allows narrow inter-row rotavation. Rubber tyred wheel ensures positive traction.

4 speeds

Bantam's 2 speed gear box with high-low ratio pulley gives 4 travel speeds . . . 2 low speeds for deep rotavation and 2 high speeds for fast shallow weeding.

AND A WIDE RANGE OF ATTACHMENTS GIVE VERSATILITY!

The tiny but tough Rotavator is the man-sized machine that's planned to give you giant savings in time, labour and money. And with Mower, Cutter Bar, Hedge Clipper, plus Tine Bar and Furrowing Attachments, you get the benefits of many machines in one! (Other attachments under development.) See how the economy-planned features of the Rotavator Bantam give you faster easier power cultivation.

Rotavators are made in England by Rotary Hoes Limited — largest manufacturers and exporters of rotary hoes in the world. Be sure you get a genuine Rotavator.

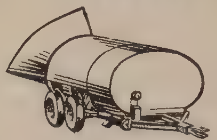
For further information see your Rotavator Dealer or write to Rotavators Ltd., P.O. Box 705, Palmerston North.

---

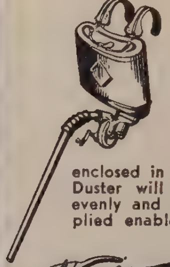
3 NEW PEST CONTROL MACHINES

G5908

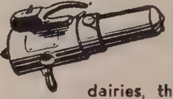
Pest and Disease Control by SPRAY, DUST or AEROSOL FOG



"TURBO-MIST" Automatic Concentrate ORCHARD SPRAYER.
Has been specially developed for the new concentrate orchard spraying method. Equipment is of advanced design, at relatively low cost. Uses much less water and spray material per acre. Only one man and a light tractor needed for operating. Light weight equipment eliminates "road roller" action in orchard. Low horsepower requirement means less fuel, lower maintenance cost, and minimum depreciation. Speedy application, which is vitally important in relation to orchard disease infection periods. SINGLE TURBINE OR TWIN TURBINE PORTABLE SPRAYERS.



"PROCALL" Duster
The finest dusting machine ever imported for New Zealand market gardeners and nurserymen. Oil immersed gears are a feature making operation easy and reducing maintenance. An ingenious adjustable vibrating feed device regulates dust flow. The turbine type fan is enclosed in a strong light weight casting. The "PROCALL" Duster will apply all normally used dusts and powders evenly and effectively. Several dust tube accessories supplied enable versatile operation.



"MICROSOL" Aerosol Fog Generator.
A new rapid method of generating penetrating aerosol fogs for use in warehouses, ships, hospitals, food stores, dairies, theatres, public buildings and glass houses. Insecticidal solutions can be dispersed as a fine mist for control of flies, fleas, cockroaches, moths, grubs and beetles. This entirely new type of machine is available as the "MICROSOL" 202 Hand Model (electrically driven, easily carried), or in larger sizes as "MICROSOL" 303 and 304 Portable Models.

If particulars not available from your Dealer, write direct to:—

FRUITGROWERS CHEMICAL CO. LTD., Chemical Works, PORT MAPUA, NELSON

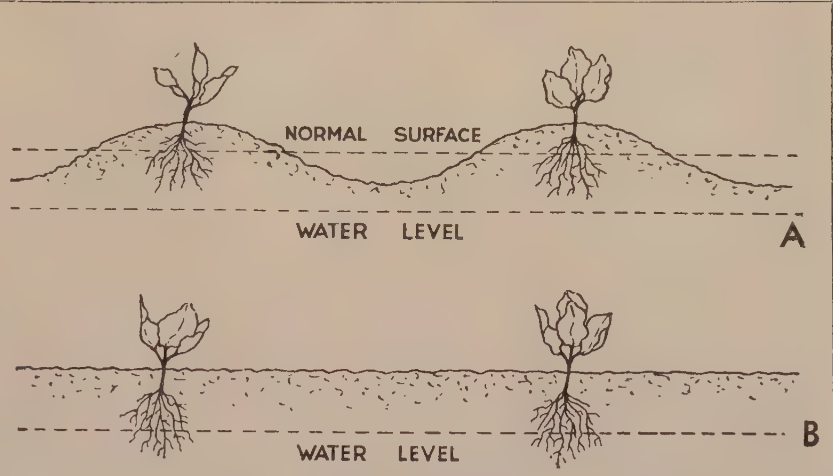
In summer especially it pays you to feed

TOMOANA DOG CRACKERS

because

1. One pound of Tomoana Dog Crackers is equal, in food value, to 2½ lbs. lean beef.
2. They can be bought economically in bulk—keep fresh for months.
3. They are clean—easy to store and handle.
4. Dogs fed on Tomoana Crackers without access to raw offals will not harbour Hydatids.
5. Tomoana Dog Crackers are a **balanced** ration— compounded of pure meat and cereal.
6. The meat in Tomoana Crackers is scientifically processed to retain the maximum raw meat vitamin content which is mostly lost in ordinary **cooked** meat—the only other safe meat ration for dogs.

will germinate well up to 2in. below the ground.



Where drainage is poor crops planted on ridges (A) are more likely to succeed than those on the flat (B).

Planting out

Planting out is an important phase of garden work and often the point from which disappointing results stem. Most vegetables are sensitive to any form of check in growth, especially cauliflower and celery. These two vegetables require to grow steadily and any check may cause them to go straight to seed. The same applies to a slightly less extent with other vegetables. If the soil is at all dry, seedlings should be well watered the day before lifting and their new position prepared.

After lifting, plants should be set out with the minimum of delay and the soil should be well firmed around the roots. Plants purchased from shops are sometimes rather dry at the roots. Soaking in water overnight will assist them to establish more quickly after planting.

Soil Conditions

For satisfactory growth plants require a certain amount of warmth, moisture, air, and nutrients. If any one of these is lacking, the crop may fail. Heavy soils and soils lying to the south are cold in early spring and the gardener who attempts to sow too early on them will certainly be disappointed with his crops. On the other hand such soils will withstand dry summer conditions much better than lighter, warmer types.

Natural rainfall requires supplementing by hosing in most districts during summer, and many failures are caused by too frequent light waterings. Under these conditions plant roots tend to come to the surface and as soon as the water has been taken up by the plants or evaporated into the air the plants suffer. Every effort should be made to encourage a deep rooting system by deep cultivation before planting, by incorporation of organic material into the soil, and, when required, by thorough watering. The need for artificial watering will be greatly reduced if crops are mulched with a 1 to 2in. layer of compost or sawdust. A mulch applied when the soil is moist will conserve moisture and reduce the packing down and consequent lack of aeration caused by walking along the crop rows to harvest the vegetables.

Plant nutrients play a major part in the growing of all crops. Unfortunately the days when animal manures were readily available have gone and it is now desirable to supplement green crops and compost with organic and inorganic fertilisers. Land that has been cropped with vegetables for some time without replacement of the foods removed with the crops will almost certainly give disappointing results, and the effect of adequately manuring each crop individually with suitable manures will give satisfaction to the grower.

Diminishing crop yields over a number of years caused by lack of plant foods is a gradual process and is frequently unnoticed until it is fairly difficult to restore the land to its original fertility. Soil lacking in organic matter will produce indifferent crops, and it will be difficult, if not impossible, to keep it in a good, friable condition. Regular green

A mulch applied to the soil in spring will reduce the need for artificial watering. [*R. W. Orr*

BANK of
NEW ZEALAND

"My Bank"

to thousands of Farmers

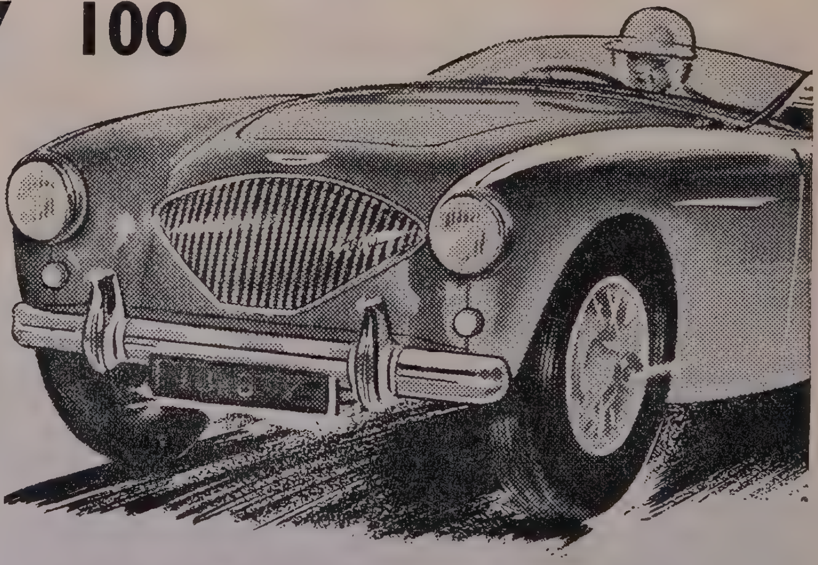
When the farmer says, "I'm calling on my bank" he more often than not means the Bank of New Zealand. As the largest banking business in the Dominion, the B.N.Z. offers the farmer unrivalled banking facilities with helpful counsel based on a sound knowledge of local conditions. Your enquiries are invited.

BANK OF NEW ZEALAND

More than 290 Branches and Agencies in the Dominion. Established 1861.

18.IC

RECORD SMASHING AUSTIN-HEALEY 100



World's fastest Production Car under 3,000 c.c. capacity!

★ 142.636 m.p.h.

● At Bonneville Salt Flats, Utah, U.S.A., beginning September 9th, the swift-footed Austin-Healey for 10 days sustained speeds of well over 100 m.p.h. ● During this time it captured over 100 International, National and American Stock Car records—including, at 142.636 m.p.h., the world's land speed record for a production model of under 3,000 c.c. capacity! ● Powered by the magnificent Austin A90 4-cylinder engine, the new Austin-Healey Hundred has already proved itself to be a world-beater!

the brilliant AUSTIN-HEALEY 100

Distributors for AUSTIN OF ENGLAND.

Auckland: **Seabrook Fowlds Ltd.** Hawke's Bay: **Anderson and Hansen Ltd.** Wellington: **Magnus Motors Ltd.**
Taranaki: **The Farmers' Co-op. Orgn. Society of N.Z. Ltd.** Canterbury & Westland: **David Crozier Ltd.**
Otago: **Austin Motors (Otago) Ltd.** Southland: **P. H. Vickery Ltd.**

cropping or addition of compost or straw will maintain the organic content.

Weeds

Weeds are the indirect cause of many garden failures; they compete (usually successfully) with the vegetables for moisture and food, they prevent free air circulation around the plants, and they harbour many pests and diseases.

A gardener who practises clean cultivation has won half the battle toward producing good crops.

With land infested with perennial weeds such as twitch and convolvulus it is best to fallow the ground for a season before planting vegetables and to hoe young weed shoots as soon as they show above ground. Perennial vegetables and herbs, such as asparagus, rhubarb, mint, thyme, and sage, should never be planted until the soil is clear of serious perennial weeds.

Diseases and Pests

The ravages which can be wrought by diseases and insect pests are well known, but many failures attributable to one or other of them could be prevented or arrested with modern sprays or dusts. Prevention is important, as many diseases are extremely hard to control when they gain a hold.

Recommendations for the control of insect pests and diseases appear regularly in the monthly home garden articles in the "Journal". If this advice is followed, little trouble should be experienced from this cause.

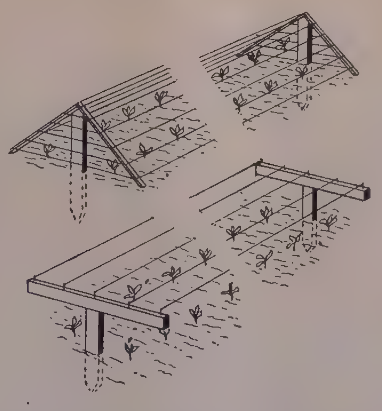
[*R. W. Orr*

Unless organic matter is added, the structure of the soil will deteriorate and production will drop.

Harvesting and Storage

Vegetables such as onions and pumpkins form a valuable addition to the supply of winter vegetables, but unless care is taken with harvesting and crops are thoroughly ripened off, failures will occur. Fortunately other winter vegetables, such as carrots, parsnips, and leeks, can be held in the ground in most parts of New Zealand until required.

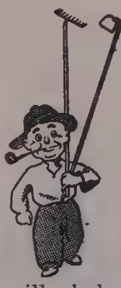
Stored crops do best under dry, airy shady conditions where the temperature is fairly constant and there is protection from the weather, but even where harvesting conditions have been excellent and storage conditions are good, it pays to go through the crop periodically to remove vegetables which show signs of breaking down.



Methods of protecting lettuce and other plants from birds, using wooden supports with black cotton attached; these types of supports can be moved easily from one bed to another.

The list of reasons for failures may seem rather formidable, but provided adequate care is taken with plants at all stages of their growth, few crop failures should occur. Though complete success over a number of years will rarely be achieved, as there are many factors affecting growth which are beyond the grower's control, a reason should always be sought for an unsatisfactory crop and every effort made to rectify the trouble in future.

Work for February



Though the main activity in the garden during February will be the harvesting of vegetables, there is plenty of other important work. The hoe and other cultivating implements should be kept going to keep the surface soil loose, as soil quickly becomes consolidated by watering or through walking over it. A loose, dry mulch will retard weed growth and will help conserve moisture. On heavy soils that are inclined to crack a mulch of straw or sawdust 1in. thick will be found helpful in conserving moisture. This mulch when worked into the soil later will help to make the soil more friable. Mulches may be spread close up to the plants and will help to protect the roots from drying out.

Asparagus beds should be kept weeded and if the fern growth is falling over, it should be supported. Stakes driven in at intervals around the edge of the bed and strong string attached to them should provide sufficient support.

Crops of beetroot, carrots, parsnips, and lettuce should be thinned and all crops should be kept weeded. Weeds not only use the plants' food, but are hosts for insects and diseases. At this time of year there should be little difficulty in killing weeds by lightly hoeing the soil.

As they reach maturity beans, peas, and cucumbers should be harvested. If the fruits of these plants are allowed to mature their seeds, the plants will lose vigour and the yield will be smaller. Seed stalks on rhubarb should be removed as soon as they appear by cutting them off 2in. above the ground. The leaving of seed stalks until seed forms may exhaust the plants and result in poor leaf and stalk development the next season.

Tomato crops planted in October and November should now be in full production and, if given attention, should continue to yield for several weeks. Side shoots should be removed up to the seventh truss, after which they should be left to grow at will. Plants should have moisture, and they should be sprayed regularly with Bordeaux or a certified copper compound to prevent late blight. D.D.D. 25 per cent. wettable powder can be added to the copper spray to control the tomato worm.

Kumara vines should be lifted to prevent them from attaching themselves to the ground, and the ridges in which the tubers form should be kept mounded up. Kumara plants take about 5 months to mature. As maturity is not indicated by the vines, the tubers should be examined regularly and may be harvested as required as soon as the skins are reasonably firm; that is, when the skin will not rub off by pressure of the finger.

Shallots are usually ready to harvest in February. If the bulbs are to be kept for some time, they should be harvested carefully and dried thoroughly before storing. They keep best in a dry shed where there is plenty of light and fresh air.

At this time of year insect pests and diseases are usually very troublesome. Brassicas should be sprayed with nicotine sulphate or H.E.T.P. to control aphides or with D.D.T. to control white butterfly or diamond-backed moth. In districts where late blight is troublesome potato and tomato crops should be sprayed regularly with Bordeaux mixture. A careful watch should be kept for leaf spot disease on celery, and a protective Bordeaux spray should be applied as soon as it is noticed.

Most onion crops should be mature enough for harvesting; this condition is shown by the leaves turning brown or drying up. When the onions have been harvested they should be spread out in a dry, sunny place to dry off thoroughly. After drying they may be strung up in bunches or placed thinly on a wire-netting rack and stored in a cool, dry, airy place with plenty of light. If properly matured and dried, well stored onions will keep in good condition for as long as 7 to 8 months.

Ground not required for immediate cropping should not be allowed to remain consolidated and weedy, but should be dug over and left in the rough to weather or be sown with a green crop such as mustard or lupins.

Sowings

Lettuces require a rich, sweet soil with a fairly high amount of moisture throughout the growing period; wide fluctuations in soil moisture may cause the plants to bolt to seed prematurely or result in poor heads which are tough and bitter. Though the soil should not be allowed to become dry, it should never remain waterlogged for long. During February seed should be sown ¼in. deep in rows 12in. apart and plants thinned from 6 to 9in. apart in the rows as soon as they are large enough to handle. A variety that is suitable for a wide range of conditions is Webbs Wonderful (Neapolitan); there are winter and summer strains. Great Lakes is also a good summer variety.

Cabbages: In northern districts seed of early maturing varieties, such as Golden Acre, Enfield Market, Flower of Spring, and Jersey Wakefield, may be sown. In colder climates varieties of savoy may still be sown. Seed sown now will produce plants for autumn plantings.

Cauliflowers: In Auckland and Northland and in areas where the climate is similar cauliflower seed can still be sown. Recommended varieties are Phenomenal (5 months), Phenomenal (6 months), and Walcheren.

Seed of the following may also be sown in most districts:—

Beetroot: Detroit Red.

Silver beet: Lucullus and Fordhook Giant.

Carrots: An early variety, such as Manchester Table or Early Horn.

Spinach: Large-leafed Prickly.

Plantings

Celery can still be planted in most districts. It requires a deep, rich, moist soil. The land must be dug deeply and, if necessary, well enriched with good, well-rotted stable or farmyard manure. Celery may be set in single or double rows or in a bed. In single rows the plants are spaced about 8in. apart; in double rows the spacing is the same, but the two rows are placed side by side about 1ft. apart. In bed culture the plants may be set 1ft. apart each way. Row culture is best if the plants are to be banked with earth for blanching. A recommended variety for planting in Auckland and surrounding districts is Golden Self-blanching; where heavy frosts are experienced a hardy variety such as Solid White is preferable.

Cabbages: In Northland and Auckland the best varieties to be set out are Golden Acre and Hendersons Succession; for other districts Savoy Drumhead and Omega are recommended.

Cauliflowers: Early London and Phenomenal and Roscoff types may be set out in all districts.

Broccoli: Lily White, Late White, and Veitches Self-protecting are suitable varieties for all districts.

Brussels sprouts can be planted in most districts except South Otago and Southland, where the last planting is usually made in December. A good variety is Fillbasket.

Leeks: To allow the plants time to grow to a desirable size before growth is retarded by cool weather leeks should be set out without delay. Musselburgh is the favourite variety.

◆

Radio Broadcasts

RADIO broadcasts to farmers will be given during February as follows:—

1XH Hamilton, Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (Waikato stock review).

1XN Whangarei, Mondays at 8.1 p.m., Wednesdays at 8.1 p.m. (Northland stock market report), Fridays at 8.1 p.m.

1YA Auckland, Mondays at 7 p.m. (Auckland stock market report), Tuesdays at 12.35 p.m., Wednesdays at 7 p.m., Thursdays at 12.33 p.m.

1YD Auckland, Thursdays at 7.30 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock review), fortnightly on Tuesdays at 12.33 p.m. (Federated Farmers' session), Tuesdays at 6.55 p.m. (Frankton stock market report), Thursdays at 12.33 p.m., Thursdays at 7.15 p.m. (farm talks alternating with session for Bay of Plenty farmers), fortnightly on Fridays at 12.33 p.m. (pig council talk).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m.

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawkes Bay orchardist session), Tuesdays at 7 p.m., Wednesdays at 7.10 p.m. (Hawkes Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Wednesdays at 8.5 p.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Thursdays at 12.33 p.m.

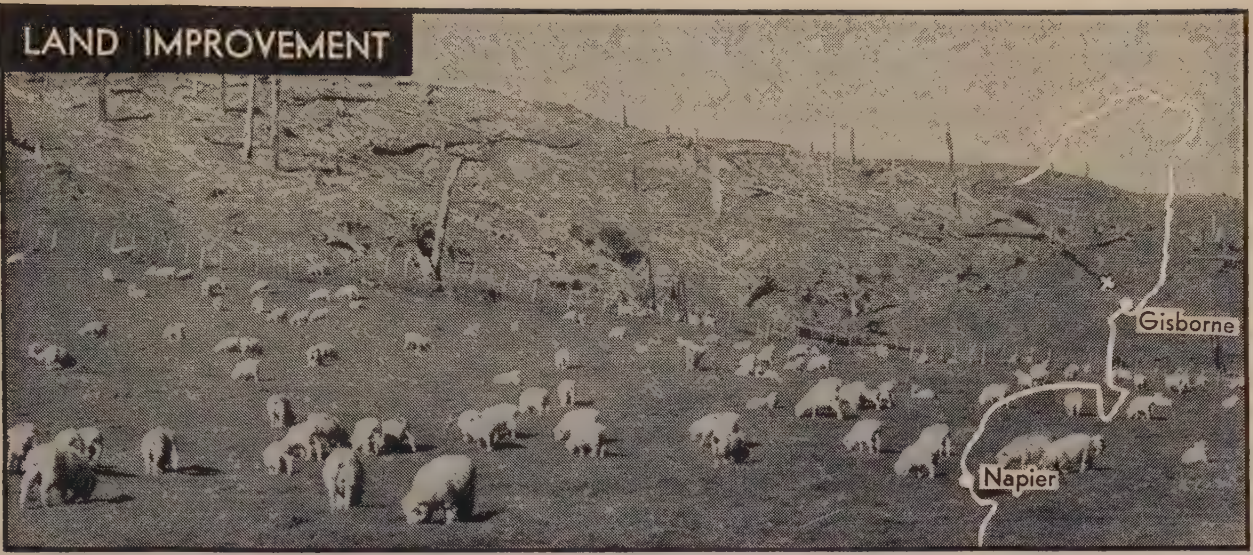
4YA Dunedin, Wednesdays at 7.20 p.m., Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m. and 7.15 p.m., Tuesdays at 7.15 p.m. (Farm and Country session, including Lorneville stock market report), Thursdays at 12.33 p.m.

◆

Meteorological Records for November

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	61.6	+ 2.5	81.1	42.6	3.70	12	— 0.14	1.27	3	207.5
Auckland	160	62.4	+ 2.0	73.8	48.0	1.95	11	— 1.35	0.38	10	180.1
Tauranga	10	61.0	+ 2.2	78.9	42.6	1.60	10	— 1.84	0.37	4	236.9
Ruakura	131	58.5	+ 1.1	76.4	35.6	2.68	11	— 1.00	0.64	8	188.8
Rotorua	975	58.6	+ 1.8	77.8	39.2	1.91	9	— 2.07	0.51	8	201.5
Gisborne	12	62.8	+ 3.8	89.0	38.5	0.48	6	— 2.11	0.17	30	265.8
New Plymouth	160	58.4	+ 1.6	67.2	44.4	4.91	16	+ 0.20	1.00	7	145.6
Karioi	2125	54.5	+ 2.6	72.5	34.0	2.22	12	— 1.64	0.42	5	
Napier	5	64.0	+ 4.4	84.7	41.5	0.62	7	— 1.47	0.18	30	247.9
Wanganui	72	61.2	+ 3.0	78.6	43.3	2.18	11	— 0.44	0.69	11	189.7
Palmerston North	110	59.9	+ 3.0	75.4	37.8	3.35	16	+ 0.49	0.70	5	165.8
Waingawa	340	58.2	+ 2.1	78.0	34.8	3.15	13	+ 0.45	1.15	5	210.5
Wellington	415	57.7	+ 1.9	68.8	42.6	2.43	15	— 0.94	0.72	8	177.4
Nelson airfield	5	57.6	+ 2.1	74.2	39.6	2.98	14	+ 0.25	0.68	3	216.0
Blenheim	12	60.0	+ 3.1	81.5	39.6	2.09	12	+ 0.38	0.58	3	225.6
Hokitika	15	55.2	+ 1.4	64.7	42.5	17.65	27	+ 7.72	2.45	28	128.8
Hanmer	1270	55.9	+ 2.1	77.0	31.5	2.03	11	— 1.45	0.40	9	178.0
Christchurch	22	59.5	+ 3.2	86.3	41.6	0.93	11	— 0.89	0.26	5	172.7
Ashburton	323	58.2	+ 2.5	83.0	36.2	1.09	12	— 1.36	0.22	5	162.7
Timaru	56	58.2	+ 2.7	86.6	37.8	1.21	10	— 0.74	0.37	4	165.6
Alexandra	520	58.7	+ 2.3	87.1	34.0	1.13	13	+ 0.05	0.35	4	193.7
Taieri	80	55.8	+ 2.4	82.9	32.2	2.43	19	+ 0.15	0.47	9	150.5
Invercargill airfield	0	53.8	+ 2.0	74.7	32.4	2.70	19	— 0.94	0.76	23	141.5



Development of Deteriorated Hill Country

ON some of the higher-rainfall areas of the Gisborne-East Cape district pasture swards which were established on the ash from bush burns thrived for a few years, but with the gradual depletion of fertility the pastures weakened, opened up, and gave way to second growth. Some areas went out of production and the carrying capacity of other areas fell considerably. In this article R. S. Whitehead, Fields Instructor, Department of Agriculture, Gisborne, describes the main features of the development of a farm on this class of reverted country in the Matawai district, some 30 miles inland from Gisborne. In 8 years carrying capacity has been increased from 0.9 ewe equivalents to 1.7 ewe equivalents per acre by topdressing and oversowing.

THE farm is 12 miles south of Matawai township and comprises 1430 acres, of which about 400 acres can be developed by cultivating with giant discs. The balance is fairly steep hills which rise to an altitude of 2000ft. Annual rainfall is between 70in. and 80in., but in early spring and summer the efficiency of the rainfall is often reduced by strong westerly and north-westerly winds, which are a feature at these times of the year. Frosts are experienced in winter and may reach 15 degrees. There are occasional falls of snow. Water on the property is supplied by creeks and springs.

Development

The farm was first taken up in 1906 and the bush was cleared, but owing to the high rainfall clean bush burns were impossible. Cheap bush burn pasture mixtures were sown and pastures soon began to revert to fern and second growth, and when the present owner took over in 1945 this was the cover on a considerable part of the property. Since taking over, the owner has improved about 400 acres. The easy slopes and rolling country were oversown with white clover at the rate of 3lb. per acre and topdressed with 2cwt. per acre of cobaltised superphosphate, the steep hill country was oversown with a mixture of 2lb. of white clover and 1lb. of subterranean clover per acre, and on the high dry faces 2½lb. of subterranean clover per acre alone was sown. Weeds and rough growth were controlled by crushing with cattle during summer and early autumn.

HEADING PHOTOGRAPH: Improved hill country (foreground) on the farm referred to in this article. The location of the farm is shown by the cross on the map.

During the last 3 years 7 miles of tracks have been formed by a contractor at a total cost of £600 to give access to the high ridges, thus enabling topdressing to be done with a blower.

Cultivation

It is planned to bring in annually 20 to 30 acres of the easier slopes with giant discs and a crawler tractor and over the past 2 years a start has been made on 60 acres. The land is giant disced and worked down in October, half being sown to swedes and turnips and half in kale. The following October or November a crop of oats is sown and ploughed under in March for manure, and a new pasture of the following mixture is sown down with the first autumn rains in late March or early April:—

	lb.
Perennial ryegrass	20
Cocksfoot	10
White clover	2
Crested dogstail	4
	36

Shelter belts have also been planted, varieties used being *Pinus radiata*, macrocarpa, lawsoniana, and mixed gums. An area of Oregon pine, Japanese cedar, and redwoods has been planted as a timber reserve.

The cost of renewing pastures by cultivation has been about £11 10s. per acre, made up as follows:—

	£	s.	d.
Giant discing	2	10	0
Tandem discing (2 cuts)	3	0	0
Harrowing and rolling ..	1	10	0
Seeding and sowing ..	4	10	0
	11	10	0

In addition some parts of the giant disced areas have been stumped, at costs up to £14 per acre.

Topdressing

The application of 2cwt. of fertiliser per acre has cost £1 17s. per acre, the costs for handling a ton being:—

	£	s.	d.
Cost of fertiliser ..	11	0	0
Railage	3	0	0
Cartage to farm	1	5	0
Sowing (tractor and blower)	3	0	0
	18	5	0

Results

When taken over in 1945 the property was carrying 1200 sheep and 232 cattle and today it is carrying 2180 sheep and 371 cattle. The progress made in increasing carrying capacity is illustrated in the following table, in which all stock has been converted to ewe equivalents:—

Season	**Ewe equivalents per acre**
1944-45	0.9
1946-47	1.4
1949-50	1.5
1952-53	1.7

Over the same period wool production has increased from 7.4lb. per acre to 12.2lb. and the lambing percentage is now approximately 77 per cent. against 70 per cent. in 1945.

The increase in production has been achieved mainly from the 400 acres which has been improved by stumping, clearing, and oversowing, and as further areas are developed there will be further improvements in the output of this farm. As the land is similar to a large area of deteriorated land in the district, it serves as an indicator of the latent productive potential of the district.

RELIABILITY
the
C.A.V.
FUEL INJECTION EQUIPMENT
solid link
ECONOMY
in DIESEL OPERATION!

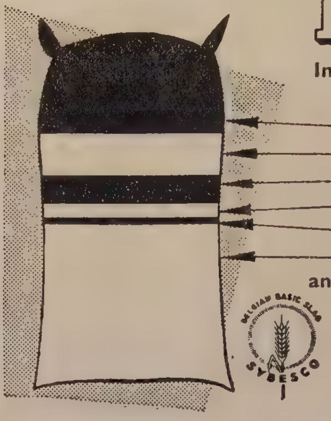
These famous British Tractors are fitted with C.A.V. FUEL INJECTION EQUIPMENT

DAVID BROWN:	Trackmaster 30
	Trackmaster Diesel 50
	Cropmaster Diesel 34
	Cropmaster Diesel 50
FOWLER:	Challenger I, III, and VF
VIVIAN LLOYD:	Dragon
VICKERS:	VR180
FERGUSON:	TE-F
MARSHALL:	Field Marshall
TURNER:	Yeoman of England
MASSEY-HARRIS:	744D
NUFFIELD:	M4

You can get service or advice from any of these C.A.V. SERVICE AGENTS:

	Phone
Whangarei Engineering Co., **Whangarei**	2639
Joseph Lucas (N.Z.) Ltd., 75-77 Beach Road, **Auckland**	34-330 (3 lines)
Unity Buildings, **Hamilton**	1618
Grey Street, **Tauranga**	1010
Commerce Street, **Whakatane**	124
L. M. Silver & Co. Ltd., 263 Victoria Avenue, **Wanganui**	2632
King Street, **Palmerston North**	5989
Jervois Quay, **Wellington**	54-555
Wooff & Salvesen Ltd., 17-19 Lichfield Street, **Christchurch**	37-607
A. M. Duncan, 34 Latter Street, **Timaru**	1594
Wooff & Salvesen (Dunedin) Ltd., 260 Cumberland Street, **Dunedin**	13-642
Ross Mitchell Ltd., Don Street, **Invercargill**	930

What you get by buying . . . BASIC SLAG



In every bag of Basic Slag according to the grade you buy, there is —

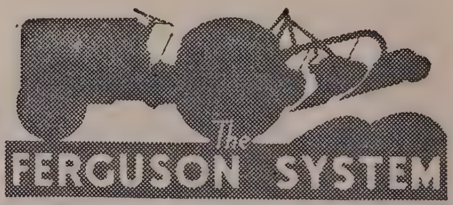
17-22% phosphoric acid
8-12% iron oxide
6-8% silicon
3-4% magnesium
1-2% sulphur
45-55% physiologically-active lime
and traces of copper, cobalt, boron and zinc.

In every bag of Basic Slag weighing 140lbs. there are no less than 112lbs. of essential fertiliser material.

Order Basic Slag from your fertiliser merchant.
Shipments arriving monthly.

BASIC SLAG

THE PHOSPHATIC FERTILISER



FERGUSON
The ONLY Tractor with these *5 exclusive advantages!*

- Traction without built-in weight.
- Penetration of implement without weight.
- Finger-tip hydraulic depth control.
- Front end kept down.
- Automatic protection of tractor and implement against hidden obstructions.

C. B. Norwood Ltd., Box 1292, Wellington.

Repairing a Bee Smoker

THE apiarist's task of examining hives would be extremely difficult without the use of a bee smoker. Every endeavour should be made therefore to have this piece of equipment working efficiently. In this article T. P. J. Williams, Apiary Instructor, Department of Agriculture, Hamilton, describes various repairs to a bee smoker.

BELLOWS which have split or perished may need re-covering. The writer has found a covering which has been in constant use for many months with no sign of cracking or deterioration and which appears to outlast leather and rubber in bellows. The material is a plasticised rexine, which is available from most furnishers in two grades at a fairly reasonable price. The rolls are 52in. wide, so that from 1yd. more than 10 coverings are made.

The material is also heat resistant, a valuable asset in a smoker. Plasticised rexine has replaced leather rexine as a covering for most furniture.

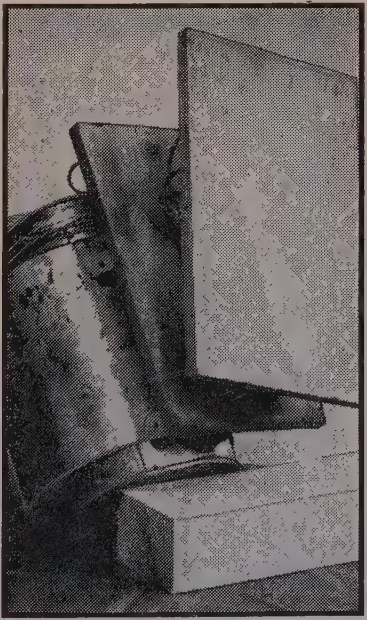
Securing Spring in Bellows

On almost every set of bellows the first splits appear on the bottom corners. This is to a large extent caused by the spring in the bellows not being set in its correct position; thus the wooden flaps do not face each other squarely. This throws unnecessary strain on every corner of the bellows.

Great care should therefore be taken to have the spring fixed securely in its correct position. A method of ensuring this is to fasten a strip of metal on to the wooden flap with the two bolts which hold the bellows to the barrel and to clamp the spring behind this strip. The heads of the bolts are soldered to the strip, and when the bellows are re-attached to the barrel the bolts are held firm and do not turn when the nuts are screwed up.

Re-covering the Bellows

The first step in re-covering the bellows is to remove the old covering carefully and then to use it as a pattern for cutting out the new covering. If a narrow strip of material is cut out to cover the bottom portion of the bellows—it should be long enough to reach 1in. up each side—it will not only hold the wooden flaps in position while the new covering is being tacked, but will strengthen the bottom corners.



The wooden flaps of the bellows of a bee smoker twisted out of position by the spring.

When tacks only are used it may be found that the bellows are not airtight because of a bulge in the material. An airtight fit can be ensured by the application of quick-setting glue to the edges of the wooden flaps before the covering material is tacked on.

Smoker Barrel

Usually the smoker barrel lasts only a few seasons, but its life may be prolonged by fitting a sleeve of copper inside the barrel to protect it from excessive heat when in use.

The barrel frequently works loose from the bellows, and this may be prevented by placing a washer on the bolt and between the bellows and barrel bracket. The end of the washer should be bent over the nut and a lock nut screwed on.

Cleaning the Barrel

The smoker barrel collects considerable quantities of tar from the fuels burnt in it. This tar is easily removed if a few pieces of loose newspaper are burnt inside the barrel, thereby baking the tar. When the barrel is cold the remaining crust can be flaked off with a scraper.

The tube at the bottom of the barrel, which conducts the air from the bellows to the barrel, should be cleaned out with a piece of wire.

Having carried out these repairs carefully, the beekeeper will have a smoker which will create confidence when bees are being handled in that the beekeeper has available a supply of smoke for their control.

A good smoker is essential both to the beginner and to the experienced beekeeper if apiary work is to be put through rapidly with a minimum of discomfort to the operator and without unnecessary killing of bees.

100,000 UNITS OF PENICILLIN

for obstinate cases of

Mammitis

MANNINGS

LONG-ACTING
PROCAINE
Penicillin

ALSO IN NORMAL AND
STRONGER 50,000 UNITS

**OBTAINABLE THROUGHOUT
NEW ZEALAND**

M.13.9

Mannings
PENICILLIN

THE AUCKLAND FARMERS FREEZING CO. LTD.

AFFCo

Champion

TESTS
AND
UNSOLICITED
TESTIMONIALS
PROVE THE
VALUE OF
OUR
PRODUCTS

The best stock foods

AFFCO CHAMPION PIG MEAL
A mineralised meal of "quality" ingredients, providing the vital inorganic trace elements together with the important B-complex vitamins and vitamin E. A general purpose meal, both profitable and economical.

AFFCO CHAMPION DAIRY MEAL
Acclaimed by prominent stud stock breeders, town milk suppliers, and owners of herds of high production figures.

Stocked by —
DAIRY COMPANIES, STOCK AND STATION AGENTS, MERCHANTS.

IT'S SPRAY IRRIGATION — THE BISLEY WAY

THAT GIVES PRODUCTION AND PROFIT

Farmers now appreciate that Irrigation
(1) Greatly increases production during an average New Zealand season.
(2) Ensures a bountiful yield from every type of crop.
(3) In dry spells as well as in droughts keeps stock on luscious green pasture.
(4) Builds up the health of stock.

We can supply the easiest operated—most economical and most efficient irrigation plant made.
We have adopted under agreement, the Patent Designs and Methods of the W. R. Ames Company of California—the largest Irrigation Manufacturers in the World.
The worlds most modern and efficient plant is available to you.

LOW — MEDIUM — HIGH PRESSURE & FLOOD IRRIGATION

Send today for full particulars.

A. M. BISLEY & CO. LTD.
Hamilton and 227 Antigua Streets, Christchurch.
Branches and Agents throughout New Zealand.

HEADING PHOTOGRAPH: An electric fence gateway which is the same width as that of the race. Control of stock with the electric fence is complete when the widths of gateways and the race are the same.

Planned Farm Layout is Key to Efficient Dairying

CAPACITY to organise is the distinguishing feature of most outstanding dairy farmers in New Zealand. Successful organisation of the dairy farm is impossible unless the layout of the farm has been planned to permit efficient day-to-day management of all the complex and interrelated aspects of modern dairying. Features which must be considered in the planning of a dairy farm layout were dealt with at this year's Ruakura Farmers' Conference Week in an address by F. T. Lees, Assistant Farm Manager, Department of Agriculture Animal Research Station, Ruakura. This article summarises the recommendations made.

AN unavoidable prerequisite to the development of a smooth-running economic dairy farm is the existence of a master plan to which it is intended to work. This must exist not in the farmer's mind but on paper. In practice it is seldom possible to start from scratch on a completely untouched area of land. In practice, too, few farms have existing layouts that are completely satisfactory. It is also unlikely that a completed layout can be attained in one major operation. Changes in layout have to be made to suit the particular method of management being used. Thus changes are made gradually as time, labour, materials, and finance permit. Without a master plan against which to work, the new layout can finish up as bad as or worse than the original. Few farmers approach the problem from this angle. Rather does the layout grow in a haphazard manner with little regard to the final outcome. Few farmers have even a plan of their properties on which to superimpose a master layout. This is the first and essential step.

The basic features of a master layout plan will, of course, be determined by the general management system to be adopted. In the following recommendations it is assumed that the system used will approximate that usually described as controlled rotational grazing management.

Location of Dairy Shed and Home

The location of the dairy shed and home, the two key working units, necessarily governs much of the layout. On established farms it is seldom possible to shift them even if they are awkwardly placed. Where possible, however, they should both be as near the centre of the farm as possible, and the provision of essential services of drainage and access must also be considered.

Access Roads

Essential modern transport services necessitate the provision of permanent all-weather access to the main working buildings. Such a road should have a width of at least 15ft. between fences, with turning room at sheds or ramps. For milk tankers a turning circle is very convenient. If the drive is long and passing room is required, a width of 20ft. is necessary.

Good drainage and consolidation are essential in road construction. The road should be built on top of the existing sward so that drainage is absorbed by the adjacent field. The use of a grader or blade to form a road causes loss of consolidation and the resulting gutters create drainage problems. Where heavy traffic is involved a metal surface is the cheapest in the long run. Sand or metal spread the normal 10ft. width of a truck is adequate at the time of establishment; maintenance will usually widen this sufficiently in most cases.

Races

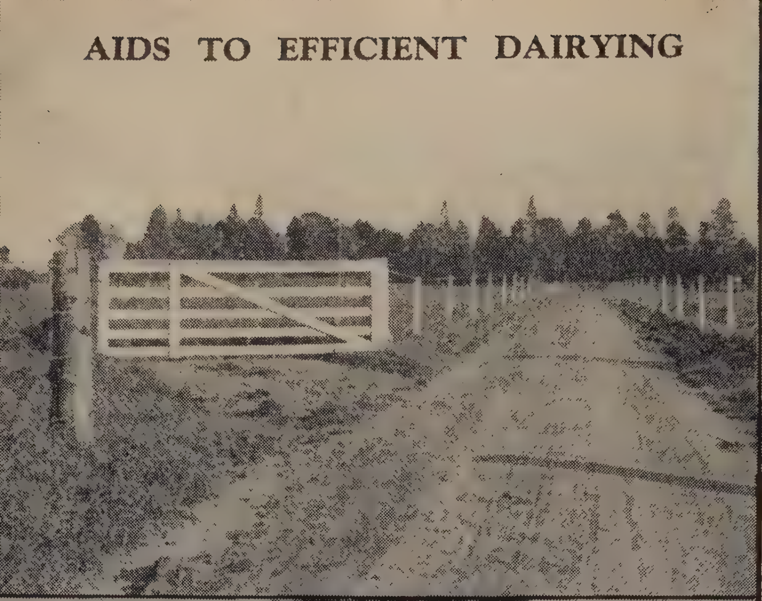
Grass produces its greatest growth when it is spelled between grazings. Farmed as a crop and eaten off as a crop, it yields its greatest return. However, one would not dare to subject another crop to the treatment given grass, when fields are used four times daily as highways for the passage of the herd to the next field or the dairy.

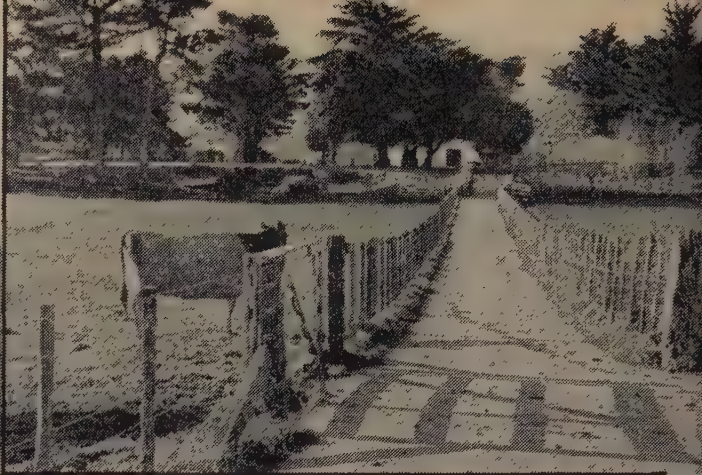
The well-designed and well-constructed farm race gives independent accessibility to each field, freedom from mud, and efficient control of stock, transport, and labour. With independent accessibility to each field, complete control of a field is permitted not only for grazing but for conservation as hay, silage, or autumn-saved pasture. Undue pugging and destruction of the sward are avoided. Freedom from mud can be achieved only with proper construction of races, particularly on heavy soil types and flat country. From gateways mud may be carried across fields to the detriment of effective pasture control.

Stock are efficiently controlled by the farm race by being able to return immediately after milking only to the field of which the gate is open; their time at the shed and fouling of yards are minimised. In addition machinery can proceed directly to its job, with maximum utilisation of labour.

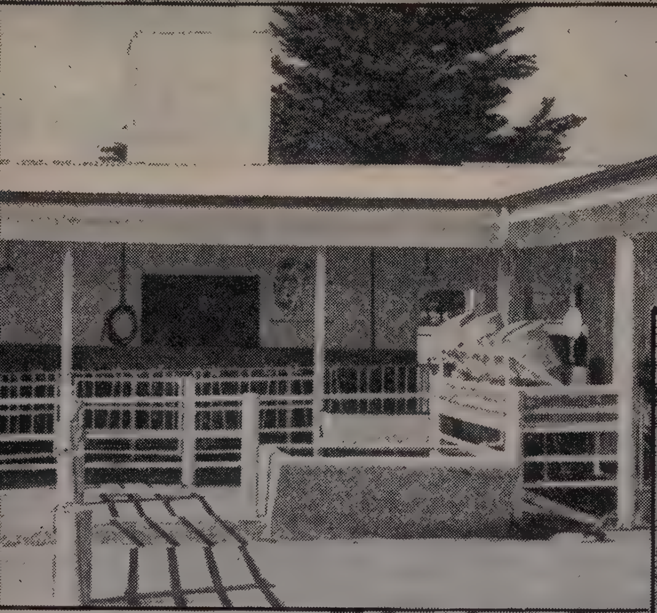
The course of the race system is partly dictated by contour. Within this limitation the principle must be

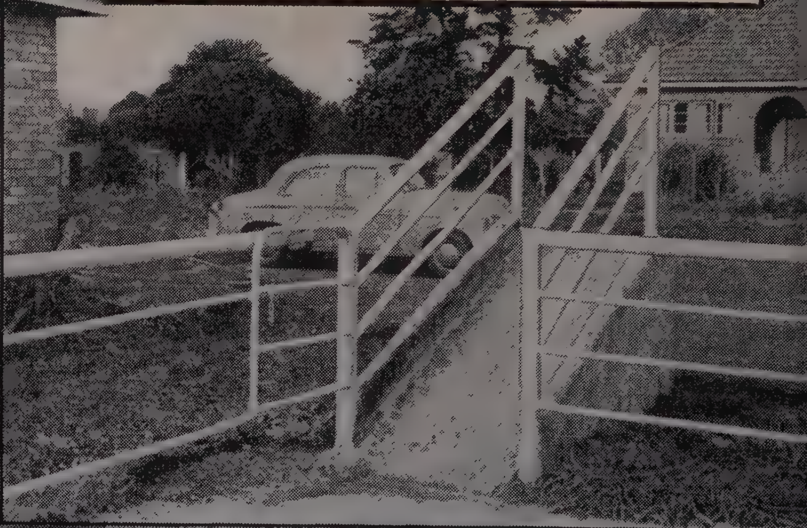
AIDS TO EFFICIENT DAIRYING

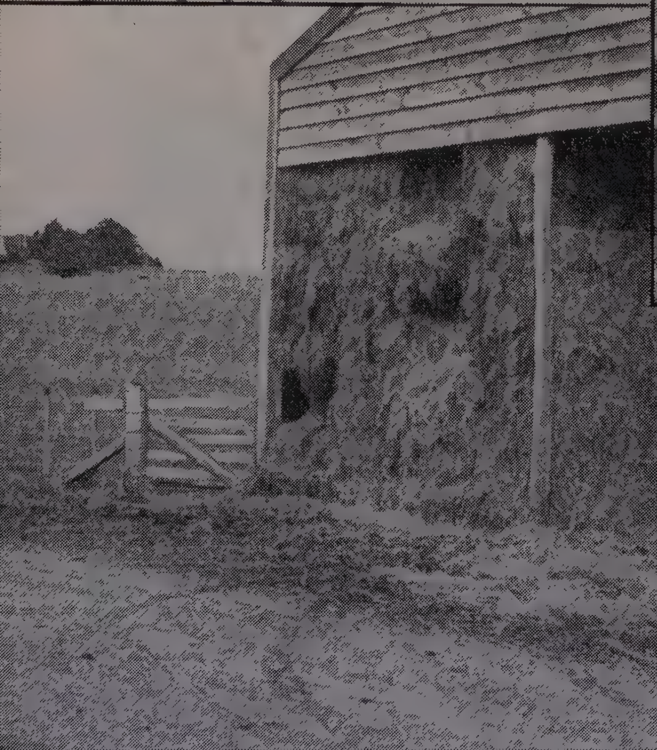


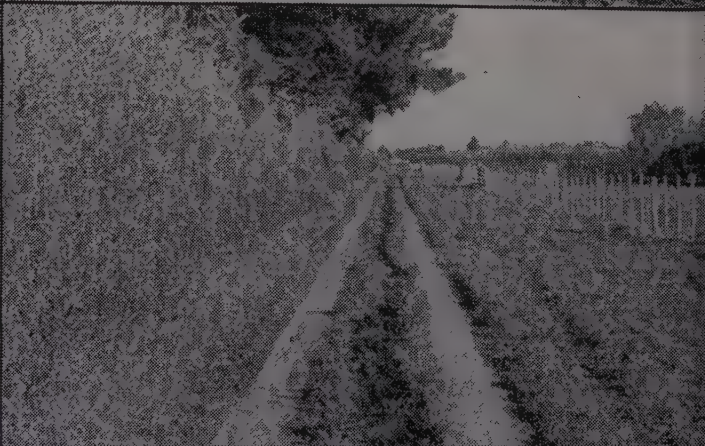


Upper left—An offset gate, which is set at an angle to the race and thus allows the entry of machinery from the race to the field. Upper right—Concrete races have the advantage that the harder it rains the cleaner they become. Middle left—Calf-feeding facilities should be incorporated in a sound dairy unit. Middle right—A ramp in the yard is convenient for loading stock. Lower left—Use of the Dutch barn with permanent race access ensures minimum wastage of hay and labour. Lower right—Where sand or shingle is not readily available concrete strips 15in. wide can be laid in place of the concrete race. The broken turf between the strips illustrated was caused by the passing of a horse and cart during feeding out. The waste strip on the right could be eliminated by the use of offset gates between race and fields.









to select the best all-weather, most direct route between fields and shed. Its course must also be so designed that it permits complete, independent serving of every existing and planned subdivision. When it is considered that each acre of land has a potential of 400lb. of butterfat the wide grass race cannot be recommended. A race 15ft. between fences serves all purposes.

Construction and maintenance can be costly if the basic principles of road construction are not followed. Most important are a sound foundation and drainage. For drainage it may be an advantage to construct the race on an elevated drain edge or, alternatively, to plan a drain necessary for other purposes to run along the same course as the race. It is often far cheaper to transport the materials for the race to a suitably drained site than to use a more convenient site which will subsequently require culverts at each gateway.

Where sand or shingle is not readily or economically available the use of two 15in. concrete strips, spaced to take truck or tractor wheel tracks, is the most practical solution. To carry a tractor load a depth of 6in. of concrete is required. Reinforcing should not be necessary except under special circumstances. Stock will use these narrow-gauge, concrete tracks in preference even to grass, and thus the mud and dust problems can be eliminated.

Roads and races should be built on top of the existing sward so that drainage is absorbed by the adjacent fields.

Gateways

Gateways are an important part of the race system. For stock and most farm machinery an 11ft. gate is quite satisfactory, provided its width is fully used. Loss in width, due to poor swinging and slamming so that the gate overlaps both posts, is a common defect. The use of a batten strap as the stop is not only effective but protects the slam post from damage by careless driving of truck or tractor. For the electric fence with electrified gateway a greater width is desirable. If such gates are at least the width of the race, they can be swung across it to give greater control of stock. Use of the spring clip and insulated handpiece ensures the efficiency and manoeuvrability of the electric fence gate.

With the 15ft. race and a wooden gate it is essential that the gate should be set at an angle to the race to allow machinery to enter each field. This is easily achieved by placing the gate across a corner of the field and cutting off the corner of the previous field to become part of the race. Where gates and subdivisions are directly opposite, this affords even greater space in the race in which to turn transport when it is not returning directly from field to shed. The gateway should be placed on the nearest corner of the field to the dairy. This gives the most direct route to and from the paddock, suits the natural inclination of stock, and utilises strainer posts most economically. The electric fence gate with full race width gateways does not require offsetting in this way.

Subdivisions

Subdivision, together with the race, is the key to controlled management. The greater the number of fields the the greater is the flexibility in grazing control. The number of paddocks is determined by the length of rotation, and the aim must be a 2 to 3 weeks' rotation. An average of 24 hours' grazing per field suffices for most of the year to give optimum utilisation. Thus 14 fields, or permanent subdivisions, are a minimum for a 2 weeks' rotation. During the spring flush paddocks closed for silage and hay are out of the rotation. At this period a stock concentration of at least 30 per acre is necessary to maintain control. Interruption of a normal 2 weeks' rotation with dry stock, pasture renewal, crops, etc., can be provided for by allowing 2 additional fields. The bull paddock and holding paddock, though both small, give a further increase, making a total of 18 fields. For a longer spelling period than 2 weeks additional fields are required.

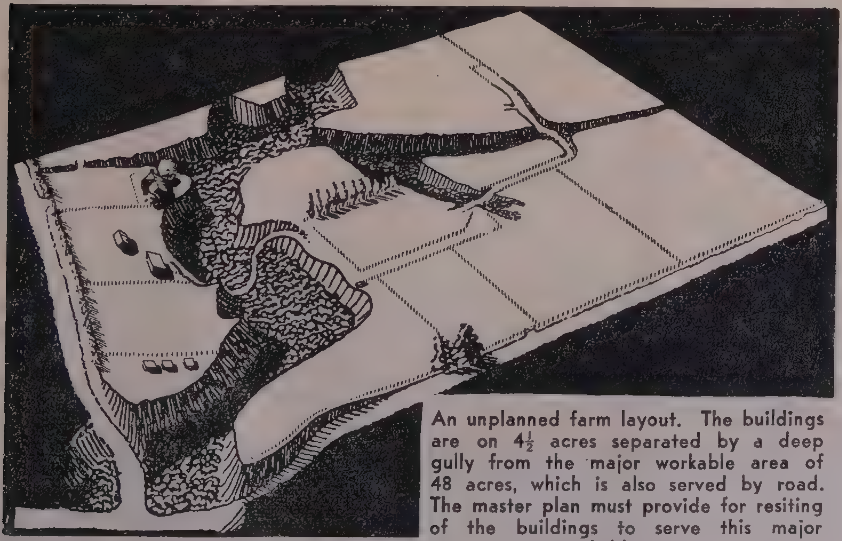
When growth is very rapid temporary subdivision of the fields in use is necessary to ensure control and maintain rotation. Temporary subdivision during feed shortages is equally important. Consideration of both permanent and temporary subdivision fencing is therefore necessary.

When the number of major subdivisions has been decided their size will be determined mainly by soil type and contour. The aim is to have each subdivision of such a size that it will provide approximately the same total bulk of feed for grazing as the others. The shape of main subdivisions also has to be planned. Though the square field is most economic in fencing costs, long and narrow fields generally fit best into modern break-grazing techniques and any temporary subdivisions and are more economic in total race length

A reasonably maintained fence of 4 plain wires will control dairy stock and is all that is necessary for main subdivisions. Barbed wire should not be used for subdividing milking paddocks and should be reserved for bull and boar pens. With high labour costs permanent materials are cheapest in the long run.

For temporary subdivisions the electric fence has no equal. In break grazing it can be moved in a few minutes if a light push-in standard is used in combination with a reel. For semi-permanent requirements a heavier standard and two electrified wires are more efficient.

Though the chief use of the electric fence is to ration and to control grazing on main subdivisions, it has a use



An unplanned farm layout. The buildings are on 4½ acres separated by a deep gully from the major workable area of 48 acres, which is also served by road. The master plan must provide for resiting of the buildings to serve this major workable area.

Munro TRIUMPH

the LAST WORD in TOPDRESSING

The Munro TRIUMPH TOPDRESSER is the only medium which will sow costly Super and other ingredients at the low quantity of 1 cwt. per acre if desired. Mixes and sows any quantity wished, up to 3 tons per acre. Also sows seeds. 14ft. spread attached trailer or truck at 10 miles an hour, an acre covered in 3½ minutes. £64 on trucks Invercargill; freight N.I. rail/air £4/10/- to £5/10/-; less by boat. Initial depreciation 30% (£19/4/-) as well as ordinary 7½% allowed off taxation.

FREE BOOKLET

FREE Booklet. Full description and instructions available by writing:

J. McCROSTIE
P.O. BOX 67
INVERCARGILL

Immediate DELIVERY

NEW ANTI-RUST AGENT!

GIVES COMPLETE PROTECTION

"3-IN-ONE" OIL

NEW discoveries have now made "3-IN-ONE" Oil batter value than ever! New rust-inhibiting agent, more penetrating power and greater "oilyness" make "3-IN-ONE" Oil the ideal lubricant and rust inhibitant for home, office, workshop and garage. For **complete** protection — buy a can today!

B4—

PREFABRICATED PIPE COWBAILS

Designed to conform to Department of Agriculture specifications for Dairy Sheds. Electrically welded and constructed of all new pipe.

Easily erected by setting in concrete floor and bolting to rafters. Designed for both single and double up machines.

Write for further particulars and price list.

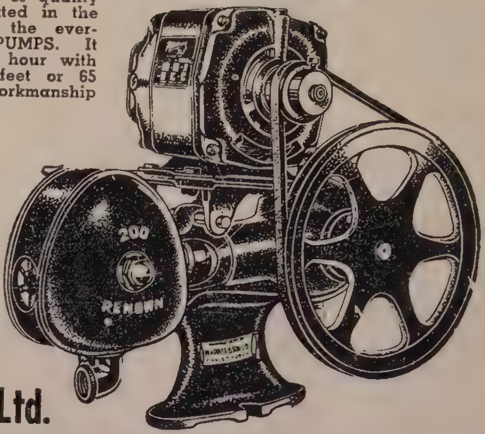
PACEY ENGINEERING
OTAKI

The Value of Experience— is built into every—

Renown 200

The experience of over 73 years of quality pump manufacturing is incorporated in the RENOWN "200," the latest of the ever-increasing range of RENOWN PUMPS. It pumps 200 gallons of water per hour with a maximum total head of 150 feet or 65 pound pressure. Year's good workmanship guarantee.

IMMEDIATE DELIVERY



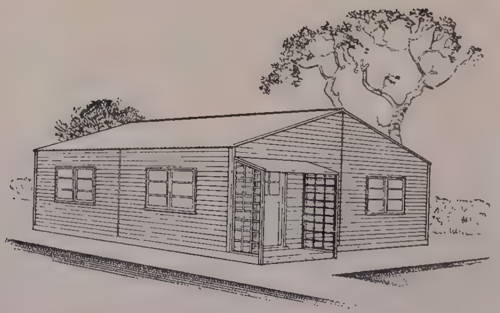
Free delivery nearest port or railway.

Inquire from your nearest Machinery Dealer or

W. H. PRICE & SON Ltd.

34-36 MANCHESTER STREET, CHRISTCHURCH. Est. 1879. P.O. Box 1084.

PREFABRICATED BUILDINGS



EASY TO ERECT YOURSELF

SIZES:
10ft. x 10ft., 10ft. x 20ft., 10ft. x 30ft. etc.
20ft. x 20ft., 20ft. x 30ft., 20ft. x 40ft. etc.

Curved Roof Prefabricated Buildings also available

Suitable for Workers' Accommodation, Halls, Stores, Offices, Baches, Workshops, etc.

Inexpensive, attractive NEW materials

WRITE TO:—

BARR-BROWNS LTD.

49 GRACEFIELD ROAD, LOWER HUTT

BB2.

for larger, more permanent subdivisions in the early stage of development of a layout. This is especially the case when labour and finance prevent immediate use of more permanent fences or where a trial of a particular subdivision plan before final decision is desirable.

Difficulties in dairy farm management which can be avoided. Above—A drainage problem has been created on the left side of this race by use of the grader. Below—Faulty construction, erosion, and lack of maintenance have been the cause of this deterioration.

Buildings

The Dairy

Regulations for dairies govern the major materials used and the distance from road and surrounds. The ultimate likely herd size must be envisaged and allowed for, as extension is seldom practicable. The value of either the single or the double-up system is governed by shed technique and machine efficiency, but some flexibility in catering for future increases can be made by the use of the double-up approach. Thus for 60 cows 4 singles are sufficient, with doubling up when required by subsequent increases; or for up to 120 cows 6 singles are adequate, with doubling up when necessary.

Saving of labour can be effected in smooth finish of surfaces to be cleaned, the use of pipe bails and rails, the avoidance of useless dirt-collecting corners, and a high-pressure pump on the water supply. Minimum yard space (12 sq. ft. per cow) and convenience of yards, including a small yard to retain the odd cow as she leaves the shed without special effort on the operator's part, are further labour-saving devices. A pen built for calf feeding and covered from the weather as part of the dairy building and a small ramp on the corner of the yard for loading stock are features which should be incorporated in a sound dairy unit. A holding yard with bail for artificial breeding should be incorporated in the schemes of the progressive dairyman.

Sheds and Stores

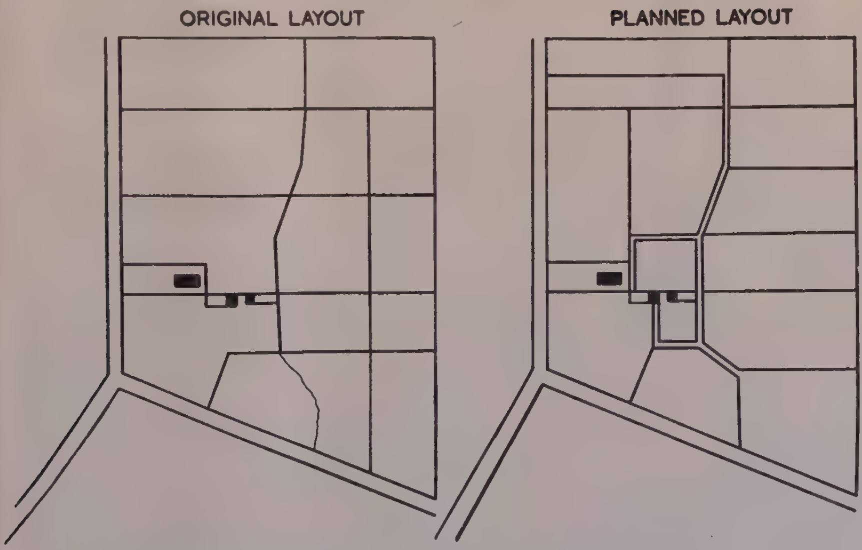
The compact combination of implement and manure shed, store and workshop, tractor shed, etc., with a common covered access is to be recommended. This covered access can accommodate a truck or tractor on which maintenance can be carried out, with all requirements at hand, in all weathers. Machinery should be stored on a long front for accessibility. If the manure section is at tray height, it has a variety of purposes and saves labour. Concrete bricks and slabs are available in several forms suited to this type of building and are suitable for construction by farmers. These facilities must be handy to the dairy shed and geared to the race system.

Piggery

The site of the piggery is important, as it should permit milk to be piped on to reduce labour of feeding and be accessible to a truck. Good drainage is vital. This, like the piggery itself, must be on the leeward side of the dairy. The requirements of a good pig layout are highly specialised and merit a full discussion on their own. Numerous published references exist on this subject and the specialised services of the District Pig Council's Supervisors are available to any interested farmer.

Hay Barns

Hay is too expensive to waste by weathering. The hay barn should be considered an essential economic part of a good layout. It should be on the race system and convenient to the shed from which feeding-out operations really begin. The cheapest type is the Dutch barn, which, however, is satisfactory only if it is protected by



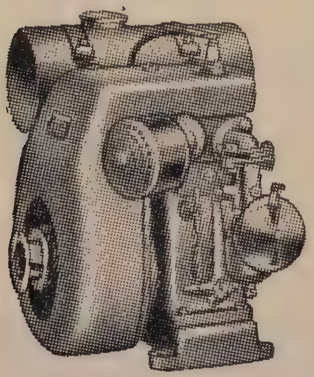
ORIGINAL LAYOUT

PLANNED LAYOUT

With the original layout this farm of 88 acres produced 14,500lb. of butterfat under a rotational management system. With the planned layout, a central race and re-alignment of the fences have given independent control of the same number of paddocks. The planned layout was installed at a capital outlay of £350, the farmer using his own labour. After two seasons production rose to 22,000lb. of butterfat.

MORE THAN 1,000,000

OF THE WORLD'S MOST *RELIABLE WORKERS!*



More than 1,000,000 . . . that's a lot of motors . . . chosen because of their dependability, higher efficiency, and lower operating costs. Throughout the world discriminating buyers have learnt they can rely with absolute confidence on the name Villiers.

Villiers

LIGHTWEIGHT ENGINES
1 - 2 - 2½ - 4 H.P.

and the same range of sizes also available with 3 to 1 reduction gear.

N.Z. Factory Representatives:
F. W. CAVE LTD., P.O. Box 1685, Auckland.

WARATAH
STEEL FENCE POSTS

WE CAN NOW SUPPLY FARMERS DIRECT.

★

NEW APPROVED PRICE
4/2 EACH
F.O.B. OR F.O.R. MAIN N.Z. PORTS.

★

For your needs write to:

RUSSELL & SOMERS LTD.,
G.P.O. Box 194 Wellington
C.P.O. Box 1284 Auckland

DAIRY FARMERS
MAINTAIN PERFECT VACUUM UNDER ALL CONDITIONS WITH . . .

'RUAKURA'
VACUUM REGULATORS

"Ruakura"
VACUUM REGULATOR
INCHES 15 MERCURY

Superseding orthodox type relief valves "RUAKURA" Vacuum Regulators hold vacuum at a stable constant level—giving maximum yield and faster milking without injury to delicate udder tissues.

Vacuum is Factory set and sealed on precision apparatus approved by the Department of Agriculture and is guaranteed to meet their standards as laid down in their Bulletin No. 260 on Mechanical Milking.

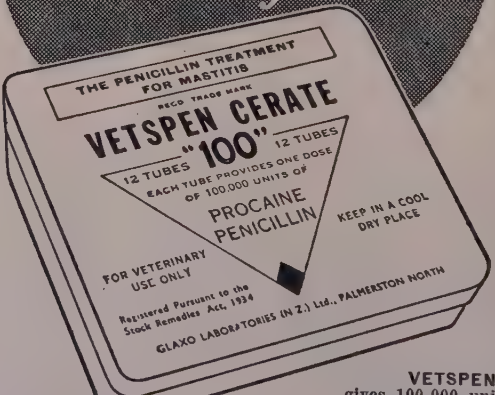
Order from your milking machine maker, or other supply house, specifying the setting required.

(Regulators are available for 10-16 inches of mercury.)

PRICE 62/- each.

Manufactured by Plastic Products Ltd., Hamilton, New Zealand.

The GLAXO PENICILLIN *Udder Injection*


THE PENICILLIN TREATMENT FOR MASTITIS
REGD TRADE MARK
VETSPEN CERATE
"100"
12 TUBES
12 TUBES
EACH TUBE PROVIDES ONE DOSE OF 100,000 UNITS OF
PROCAINE PENICILLIN
KEEP IN A COOL DRY PLACE
FOR VETERINARY USE ONLY
Registered Pursuant to the Stock Remedies Act, 1934
GLAXO LABORATORIES (N.Z.) Ltd., PALMERSTON NORTH

VETSPEN CERATE "100"
DEFEATS
even the most obstinate cases of
MASTITIS

★

PRICES
12/-
17/-
24/-
per doz. tubes

VETSPEN CERATE "100" in the red tin gives 100,000 units for intensive applications. 24/- per dozen tubes.

VETSPEN CERATE in the standard pack gives a guaranteed dosage of 25,000 units of penicillin. 12/- per dozen tubes.

VETSPEN CERATE "50" in the green tin gives a guaranteed dosage of 50,000 units. 17/- per dozen tubes.

All are made with procaine penicillin for prolonged action. Available everywhere.

A reasonably maintained fence of 4 plain wires is all that is necessary for main subdivisions, and for temporary subdivisions the electric fence is unequalled. When it is used with a reel and push-in standard the electric fence can be moved from one position to the next in a few minutes.

shelter on the windward side. Losses from breakage of twine-tied bales are too great when they are fully exposed to driving rain.

Silos

As an increasing proportion of dairy farms are becoming 1-man units, the buckrake system of silage making promises to be a relatively standard method. Ideally this requires the permanent type of trench silo with good access for both filling and feeding out, and its use is recommended where the contour and drainage allow.

Drainage

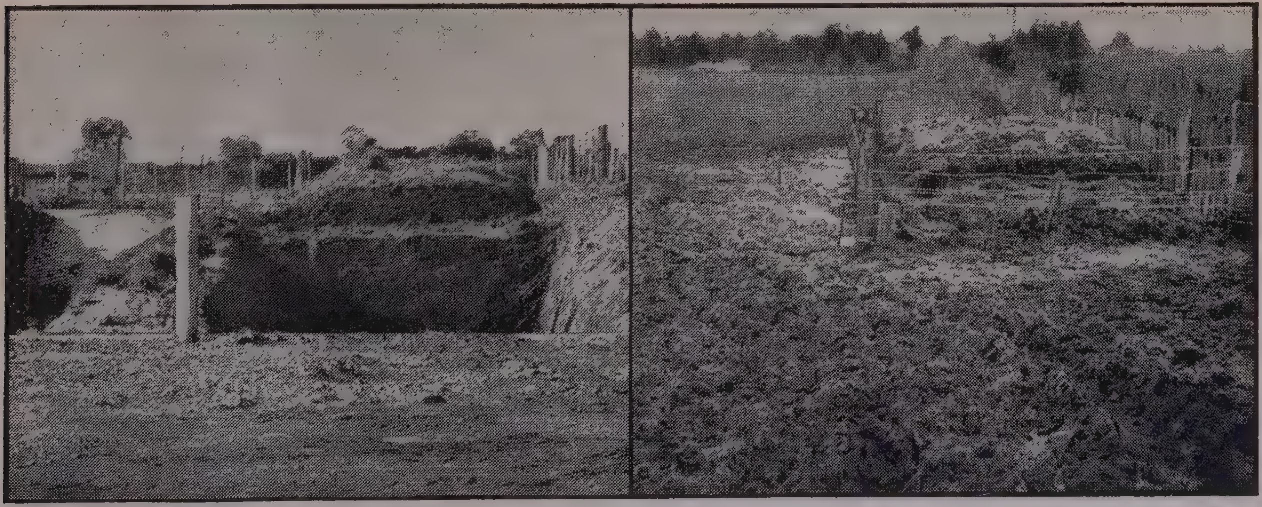
Drainage is a problem which varies considerably with soil type and contour. The various ways of handling drainage are fully explained in available literature. The bulletin on farm drainage issued by Massey Agricultural College can be strongly recommended. The open drain is a constant handicap to management and a hazard to stock and its use should be avoided if possible. Cowshed and piggery drainage, with its high solids content, must have an open drain. Part of the drain should be used as a settling tank, controlling the distance over which solids spread, so that the work of disposal is more likely to be done with the necessary regularity.

Water Supply

The planned race, subdivision, and siting of buildings enable the installation of the shortest water main to serve all requirements. This main should be adjacent to the race. Large troughs in the subdivision fenceline will serve 2 paddocks and should be at least a pipe length from the gate. This position of the trough enables economy in the use of piping and fittings and minimises interference in working the field. Water is also immediately available to temporary subdivisions, and further stock concentration is removed from the gateway. Maintenance of the trough surrounds can be conveniently undertaken with that of the race. The additional tank storage at the dairy for the high-pressure hose pump is a useful reserve in emergencies.

Shelter and Storage

There are numerous features of layout additional to those mentioned. Such items as hedges, shelter belts, etc., must all appear on the plan if their full effectiveness is to be ensured. The growing of shelter belts and hedges requiring hand trimming and maintenance must be avoided as far as possible and at most the amount



Use of the trench silo with permanent access for filling and feeding out (left) avoids the serious damage to the sward that can happen when silage is fed out from a wedge or stack with no permanent access (right).

of this work should not be greater than that with which the likely available labour force can cope. Over-planting can be as bad a mistake as under-planting. The plan should also allow for the planting of timber trees for future farm use on all waste corners difficult to grass economically.

A good layout must also provide facilities for orderly storage of the hosts of odds and ends of farm requirements that normally clutter up the farmyard and home and shed surroundings. A useful approach is a loading ramp and storage centre elevated to truck height for unloading posts, battens, timber, gates, wood, etc., which normally are dumped anywhere on spur-of-the-moment decisions. Such a unit can be run up in a few minutes with a bulldozer. It should be handy to the implement shed, dairy, and race, the main centre of activities.

In the preparation of the original master plan the object should be to retain as much flexibility as possible. As more experience is obtained of the working of a property original ideas may require modification and new ideas will be developed. These should be added to the master plan so that they can be incorporated in the farm layout when time permits.

Popularity of Aberdeen Angus Cattle in Australia

[*Australian Official photos.*

ABERDEEN Angus cattle have greatly increased in popularity in Australia during the last 20 years. They have proved their worth on soft, well-improved country, where they mature more rapidly than other breeds and yield a higher percentage of meat to bone and a higher percentage of dressed carcasses to liveweight. Their advance has been particularly marked in Victoria, Western Australia, and Tasmania, and since 1936 the membership of the Aberdeen Angus Society of Australia has increased from 67 to 253.

The Australian Aberdeen Angus cattle are different from their counterparts overseas. They are bigger-framed than their Scottish ancestors and are longer-legged than those bred in the United States. This is no doubt due to the plentiful sunlight, temperate climate, and first-class feed.

Among the first to import Aberdeen Angus stock into Australia were the owners of Belltrees Station, a model property in the foothills of the New England Range near Scone, in New South Wales. Belltrees was established in 1831, and today occupies 20,000 acres. The Hunter River winds through the property and ensures an ample supply of water throughout the year. Good flows can be tapped almost anywhere in the foothills, and the deepest sub-artesian bore on the property is only 70ft. deep. Because of this abundance of water and the improvement of the pastures over the years it is possible to carry a beast to every 5 acres and on the foothills almost a beast to every acre.

The illustrations above show in the background cattle grazing on improved pastures flanking the Hunter River on Belltrees Station, and in the foreground a recent acquisition to Belltrees stud, Jago 20th of Mangatoro, an Aberdeen Angus bull imported from Dannevirke, New Zealand.

Manurial Responses on Some Marlborough Soils

BETWEEN 1925 and 1950 about 90 co-operative trials were laid down on Marlborough farms to observe the effects of topdressing on grassland. Data provided by these trials are summarised in this article by W. F. Leonard, Instructor in Agriculture, Department of Agriculture, Blenheim.

MARLBOROUGH Land District, consisting of Sounds, Marlborough, Awatere, and Kaikoura Counties, occupies the north-eastern portion of the South Island; the sea forms its northern and eastern boundaries, the Conway River part of its southern boundary, and the greater part of its western boundary is along the crest of mountain ranges. Most of the district is mountainous, the main areas of flat land being the lower Wairau and Awatere Valleys. These flat areas and an area of rolling downland country south of Seddon take up approximately 200,000 acres, which is about 7 per cent. of the district's total land area of 2,800,000 acres.

Climate

Because of the topography there is a considerable variation in annual rainfall in Marlborough Land District. On the flat areas near Blenheim the annual precipitation is approximately 25in. and in the western mountainous area and in parts of the Sounds it exceeds 80in. Rai Valley, in the northern hill section, has an average annual fall of 86.1in. and Seddon, near the east coast, has 25in. Where topdressing is practised this difference in rainfall may influence the type and amount of fertiliser applied.

The monthly distribution of rainfall is fairly even, but in the lower Wairau and Awatere Valleys the least rainfall is recorded in summer.

Topdressing Trials

In most of the trials lime was applied initially at 1 ton of carbonate per acre and thereafter annually at 5cwt. per acre, 30 per cent. potash salts at 2cwt. per acre per annum, and superphosphate at 3cwt. per acre per annum. Most of the earlier trials also included treatments with sulphate of ammonia or nitrate of soda, and current trials in higher-rainfall districts include various forms of phosphatic fertiliser. Within recent years a soil survey has enabled the soils to be typed and the results of past topdressing trials can now be viewed in relation to the soils.

Table 1 sets out responses recorded for superphosphate and superphosphate plus lime. Dressings of potash were also applied, but in no trial was there an appreciable response. Points for responses of pastures were:—

0 = no
1 = slight
2 = fair
3 = good
4 = very good
5 = excellent

HEADING PHOTOGRAPH: Part of the Wairau Plains near Renwicktown. Trials on soils of the flat lands of Marlborough indicate that topdressing could be payable on these soils. Generally responses were more marked in areas of higher rainfall, and in practically all trials the greatest response was obtained from the combination of lime and superphosphate; smaller responses resulted from the application of each separately. Potash gave no response, and though that obtained from nitrogen was considerable, in some trials the stimulation was short lived and suggested only a seasonal usefulness. National Publicity Studios photo.

Pack it in JUTE they all agree

FARMERS—

(and all other consumers)

demand Jute Bags because goods arrive in perfect condition, handling and stacking is easier and Jute Bags have a big re-use and resale value.

Jute is back in **full**. Future supply is assured. So once more, **all** commodities which are best packed in Jute can be packed in Jute. Whether you are a Manufacturer, a cartage contractor or a consumer—whether it's fertiliser, grain, sugar, wool or many others, you'll agree genuine Jute is **best**. Jute Bags are available in any quantity, any size, any weight. Delivery is quick.

The original and still the best

JUTE BAGS

are again in full supply

CUT YOUR "COST PER ACRE" with a

DAVID BROWN

WORLD'S FINEST TRACTORS
Wheel and Crawler Models
Petrol and Diesel Engines

A David Brown Tractor gives you:

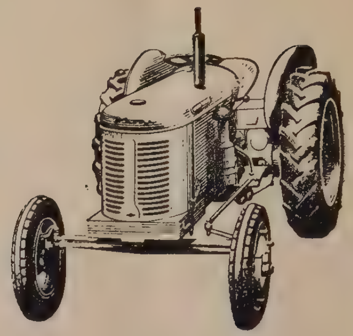
1. Amazing ECONOMY
2. Remarkable POWER
3. Exceptional LONG LIFE
4. Amazingly LOW MAINTENANCE COSTS
5. Extremely MODEST PURCHASE PRICE

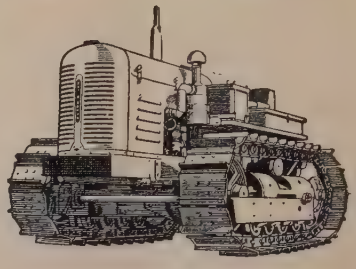
David Brown Wheel Models **£619**

COMPLETE with PNEUMATIC TYRES, HYDRAULIC LIFT, 12-SPEED RANGE comprising 6-speed gearbox and 2-speed governor, self-starter, adjustable track (front and rear), OHV engine with replaceable wet cylinder liners, force feed lubrication, shell type main and big end bearings, heavy duty stub axle bearings, magnetic oil filter.

David Brown Crawlers from **£1299**

COMPLETE, f.o.r. main ports, with 6-speed gearbox with 12-speed range, 4-speed PTO, choice of track widths, controlled differential power steering, electric starter, replaceable cylinder liners, force feed lubrication.





The SAFE Tractor

Send for David Brown catalogue to the N.Z. Distributors.
TODD BROS. LTD.,
WELLINGTON.
DEALERS EVERYWHERE

The Cheapest Fence

IS THE ONE THAT LASTS LONGEST

Durable fencing will save you costly repairs, renewals, and re-erection. **JOHNSON'S WIRE** is made expressly to last —drawn with the skill of 150 years' experience, from carefully chosen steel, protected by **PATENT HOT DIP GALVANIZING** the heavy coating of which ensures long life, even under severe conditions.

Johnson's Patent Hot Dip Galvanizing is a protective zinc coating, unaffected by hammering, bending or twisting. Leaves no exposed places for rust to attack.

FURTHER SUPPLIES ARE EXPECTED EARLY IN 1954

JOHNSON'S ENGLISH FENCING WIRE

Sole New Zealand Agents:

JOSEPH NATHAN & CO. (N.Z.) LTD.
P.O. BOX 1792, WELLINGTON — P.O. BOX 949, AUCKLAND.
P.O. BOX 1604, CHRISTCHURCH.

TABLE I—RESPONSES TO SUPERPHOSPHATE AND SUPERPHOSPHATE + LIME ON SOME MARLBOROUGH SOIL TYPES

Soil type	Response Superphosphate	 Superphosphate + lime
Soils of Flat Lands		
Omaka sandy loam ..	2	3
	2	3
	3	4
Omaka gravelly loam .	4	5
	3	4
Fairhall silt loam ..	2	3
Spring Creek heavy silt loam	3	4
	3	4
Lagoon complex ..	1	2
Waimangarara mottled silt loam	2	3
Waimangarara silt loam	3	4
	2	3
Hapuka loam	3	5
Upper Wairau sandy loam	2	4
Koromiko stony silt loam	3	4
Koromiko silt loam ..	2	3
	3	4
	3	4
	2	3
Koromiko sandy loam	2	3
Ronga silt loam ..	3	4
	3	4
	3	4
Soils of Undulating and Rolling Lands		
Sedgemere silt loam ..	2	3
	2	3
	2	3
	2	3
Seaview silt loam ..	1½	2
Ward clay loam ..	2	3
Renwick stony loam ..	3	4
	1½	2
Hillersden stony silt loam	2	3
	3	4
	2	3
	3	4
	3	4
Jordan silt loam ..	1	1½
Kaituna silt loam ..	3	4
	1	3
Opouri silt loam ..	2	3

In all the trials lime when applied alone gave responses ranging from slight to fair. It will be seen, therefore, that on all soil types practically the same results were obtained, the best responses being from the combination of superphosphate and lime.

Soils

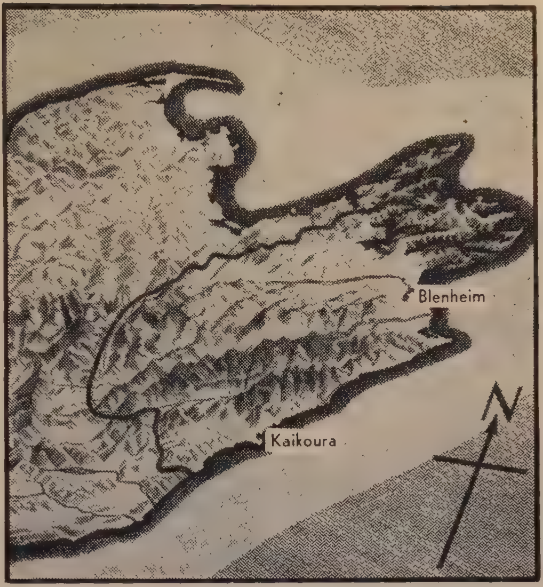
The soils of Marlborough may be conveniently described in three divisions:—

1. Soils of the flat lands.
2. Soils of the undulating and rolling lands.
3. Soils of the hilly and steep lands.

Soils of Flat Lands

Soils of the flat lands comprise river flats, swamps, and reclaimed coastal lagoons. The soils, which occur extensively in the Wairau Valley and in small areas elsewhere in Marlborough, have been built up gradually by the recent accumulation of water or wind deposits and they generally contain moderate to high amounts of plant nutrients. In the low-rainfall districts productivity depends largely on moisture conditions. Use of gravelly and sandy soils is limited by shortages of moisture, but the fine-textured soils are suitable for cropping where they are free draining and for dairying where drainage is slow.

All soil types included in the trials responded in some degree to the fertilisers applied, which indicates that topdressing could be payable. Generally responses were more marked in areas of higher rainfall, and in practically all trials the greatest response was obtained from the combination of lime and superphosphate; smaller responses resulted from the application of each separately. Potash gave no response and although that obtained from nitrogen was considerable, in some trials the stimulation was short-lived and suggested only a seasonal usefulness.



[*From map prepared by New Zealand Department of Education*

Relief map of Marlborough. The boundaries of the province are indicated by the black line.

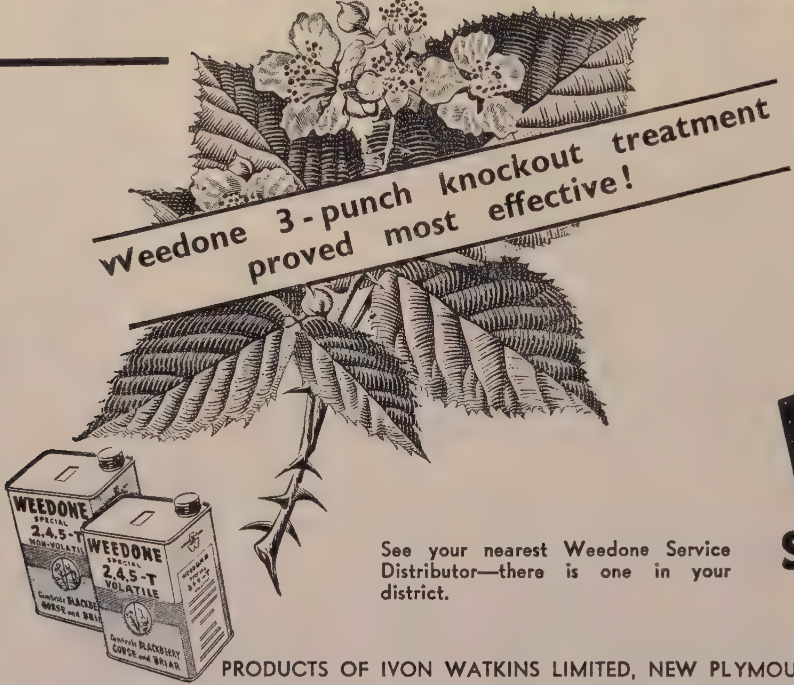
Soils of Undulating and Rolling Lands

On the undulating and rolling lands soil development depends principally on climate and vegetation. The soils may be subdivided into the Sedgemere-Renwick soils, the Jordan-Hillersden soils, and the Kaituna-Branch soils. The first-mentioned type of each group represents a fine textured member and the second-mentioned type a stony member of the group.

The Sedgemere-Renwick group of soils is formed on the coastal lowlands between Blenheim and Ward under a warm, dry climate and low tussock grassland. Fine-textured soils consist of grey, very friable silt loams over yellow, strongly compact clay loams. Soil moisture varies widely throughout the year, topsoils becoming dry in summer and often waterlogged in winter and early spring. Renwick stony loam is always well drained, but dries out rapidly in droughty periods.

Below—Hilly and steep country bordering the Awatere River. On this country run-off is rapid and the soils require a dense cover of vegetation to conserve moisture and to prevent erosion. Improvement of fertility by wise management and regular use of fertilisers is a feasible method of preventing reversion, but the scarcity of labour over recent years have tended to reduce the area topdressed to almost negligible proportions. V. C. Browne photo.

Control *Blackberry*



Weedone 3-punch knockout treatment proved most effective!
WEEDONE SPECIAL 2,4,5-T NON-VOLATILE
Controls BLACKBERRY GORSE and BRIAR
WEEDONE SPECIAL 2,4,5-T VOLATILE
Controls BLACKBERRY GORSE and BRIAR

Planned, 3-year spray treatment with Weedone Special 2,4,5-T completely controls Blackberry! It's been proved on thousands of New Zealand farms! Weedone Special is the only oil-based 2,4,5-T available in Volatile and Non-Volatile esters. See your Weedone Service Distributors about Weedone Special 2,4,5-T and Hi-Vol Spray Equipment Models 59 and 62.

See your nearest Weedone Service Distributor—there is one in your district.

WEEDONE

SPECIAL 2,4,5-T

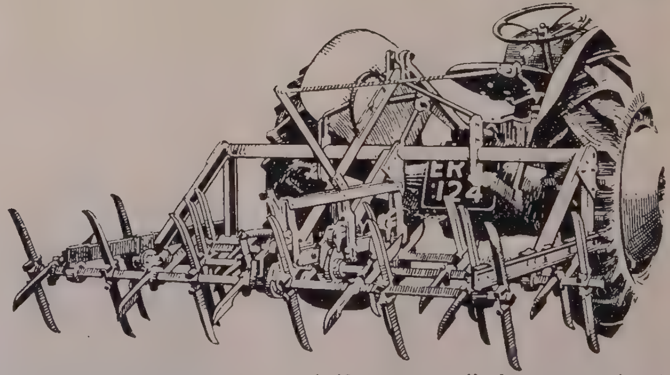
PRODUCTS OF IVON WATKINS LIMITED, NEW PLYMOUTH . . . HOME OF THE WEEDONE SERVICE.

IW.65

Order Now!

WILDERS UNIVERSAL "PITCH-POLE" IS THE MOST VERSATILE IMPLEMENT AVAILABLE TO FARMERS—COMBINING A GRASSLAND HARROW AND ARABLE CULTIVATOR.

SPECIAL VALUE FEATURES—the 6ft. 6in. unit has 17 pairs Arable Tines and 14 pairs Pasture Tines (62 Tines in all). Larger units, more tines.
PITCH OF TINES—Simply adjusted (enables unit to deal gently, firmly or drastically as required for pasture renovation, normal cultivation or *twitch eradication*). Tines heat-tested, drop forged, and specially shaped for deep or shallow penetration.



SELF CLEANING—Tines rotate half turn at will, leaving residue in windrows.
SPACING—can be altered to suit requirements or all tines mounted on centre bar for sub-clover harvesting.
AVAILABLE IN 6ft. 6in., 7ft. 3in., 8ft. 3in. SIZES, TRAILED OR HYDRAULICALLY MOUNTED.

RELIABLE SERVICE EVERYWHERE

ANDREWS & BEAVEN LTD

HEAD OFFICE: MOORHOUSE AVENUE (P.O. Box 138) CHRISTCHURCH

Branches: Auckland (P.O. Box 2528), Wellington (P.O. Box 1868), Ashburton (P.O. Box 17), Timaru (P.O. Box 145), Invercargill (P.O. Box 5).
NORTH ISLAND AGENTS: James & Whimp Ltd., Whangarei; Auckland Farmers' Union Co-op. Society Ltd., Auckland; Bayliss & Booth Ltd., Te Puke; Newton King Ltd. (Waikato Agents), Hamilton; D. S. Mitchell & Coy. Ltd., Tauranga; H. S. Motors Ltd., Gisborne; D. Wilson (Whakatane) Ltd., Whakatane; Manawatu Machinery Exchange Co. Ltd., Palmerston North; Wanganui Machinery Exchange Ltd., Wanganui; Newton King Ltd., (Taranaki Agents), New Plymouth; Bull & Hodgins Ltd., Hastings; Masson Implement Co. Ltd., Carterton.
SOUTH ISLAND AGENTS: Levin & Co. Ltd., Nelson; W. G. G. Cuddon Ltd., Blenheim; W. G. G. Cuddon Ltd., Kaikoura; West Coast Agencies Ltd., Greymouth; Ernest Reid & Co. Ltd., Oamaru; Donald Reid & Co. Ltd., Dunedin.

These soils are used for mixed cropping and sheep farming, high production depending on making the best use of rainfall received during the growing season by the maintenance of the structure and organic matter content of the topsoil.

Responses to fertilisers on these soils were similar to those on the drier, flat land soils. The greatest response came from the application of lime and superphosphate, with lower responses to superphosphate and lime used separately. The response to nitrogen was similar to that obtained on the flat land soils and once again no response followed the use of potash.

The Jordan-Hillersden soils occur in the middle portions of the Wairau, Waihopai, and Awatere Valleys and in the coastal belt between the Flaxbourne and Conway Rivers. They are formed under a mild, humid climate and an original vegetation of mixed shrub and beech forest. Topsoils are brownish-grey silt loams which below 7in. grade into yellow, slightly to moderately compact clay loams. Compared with soils of the first group these soils are rarely subjected to droughty periods, but the improved moisture conditions result in a greater lime and fertiliser requirement for high pasture or crop yields.

Manurial trials showed that the greatest response was to lime and superphosphate, with lower responses to lime, superphosphate, and nitrogen used separately. Potash again gave no response.

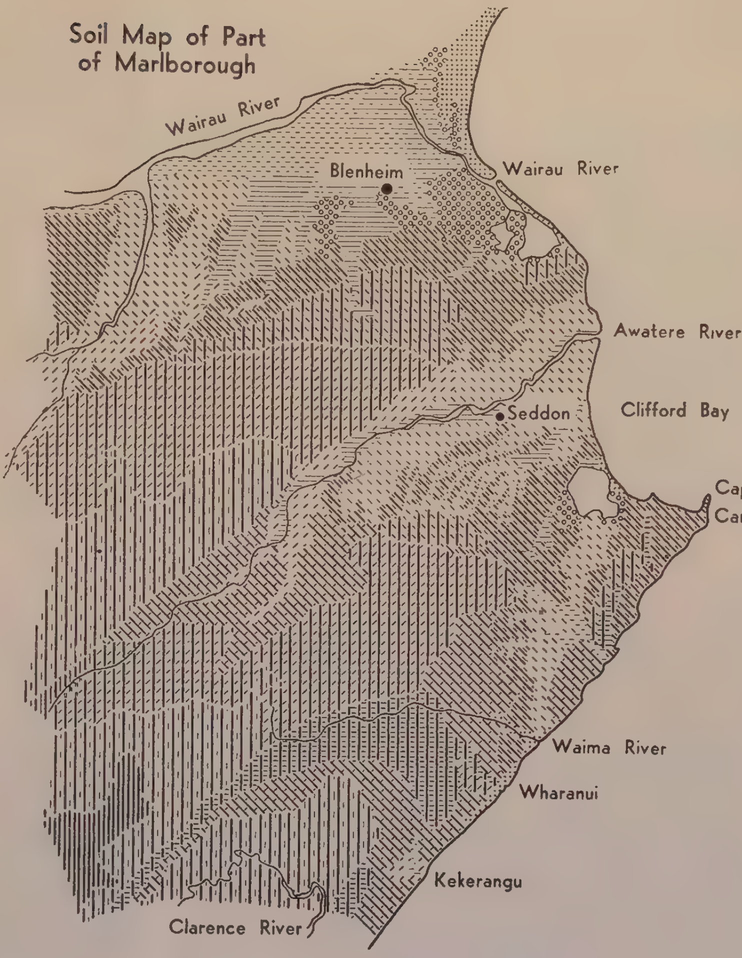
The Kaituna-Branch soils are in the cooler and wetter lowland parts of Marlborough, where the native vegetation was mixed beech and rain forest. Under these conditions in the Rai, Koromiko, and Upper Wairau Valleys soluble materials are continually being lost from the soils, which are more leached than in other regions of Marlborough. Topsoils are brown friable silt loams passing abruptly to yellow subsoils of similar texture at 6in. or less from the surface.

Results of trials confirmed the need for lime and phosphate, the best results coming from the use of these in combination. A good response to superphosphate alone was obtained, with a lower response to lime alone, a seasonal one to nitrogen, and practically none to potash.

Soils of Hilly and Steep Lands

Soils of the hilly and steep lands are derived chiefly from sandstone or mudstone. They are similar in general properties to those on the adjacent valley land, except that the topsoils and subsoils are shallow and contain pieces of the underlying rock. Run-off is rapid and the soils require a dense cover of vegetation to conserve moisture and prevent soil erosion. Adequate pastures for these purposes can be maintained under controlled grazing on hilly and steep slopes, except in the cool or wet regions where the soils are poor and susceptible to rapid erosion.

Considerable areas of such poor soils have been cleared in parts of the district north of the Wairau River and continued efforts are necessary to prevent their reversion to fern and subsequently to scrub and forest. Improvement of fertility by wise grazing management and regular use of fertilisers is a feasible method of preventing reversion, but the scarcity and high cost of labour over recent years have tended to reduce the area topdressed by hand to almost negligible proportions. Originally grasses demanding a high level of fertility were sown after the land was cleared of forest, and as the initial high fertility from the ash was lost these species could not persist and were replaced by less productive species and later by fern and scrub. As hand topdressing was discontinued a good deal of this country to some extent went out of production.



From a soil map supplied by the Soil Bureau, D.S.I.R., Wellington

▨	1.	Opawa-Wairau soils on free-draining river flats.
▨	2.	Spring Creek soils on slow-draining river flats.
▨	3.	Fairhall-Omaka soils on low terraces.
▨	4.	Taumutu soils on stony and sandy beach banks.
▨	5.	Saline and fresh-water swamp soils.
▨	6.	Sedgemere-Renwick soils on undulating lands.
▨	6H.	Soils on hilly lands associated with 6.
▨	6S.	Soils on steep lands associated with 6.
▨	7.	Jordan - Hillersden soils on undulating lands.
▨	7H.	Soils on hilly lands associated with 7.
▨	7S.	Soils on steep lands associated with 7.
▨	8S.	Kaituna-Branch soils on steep lands.
▨	9.	Molesworth-Acheron soils on undulating lands.
▨	10.	Soils derived from limestone on steep lands.
▨	11.	Soils derived from basalt on steep lands.
▨		Bare rock.

Soils derived from limestone and basalt differ in colour and in texture from other soils on the hilly and steep lands, but similar moisture and erosion problems occur on them.

Present Practices

It is interesting to see if topdressing practices follow the results shown by the trials. Table 2 shows the extent to which pasture topdressing has increased since the mid-1930s, and as the bulk of the artificial fertilisers used would certainly be superphosphate, farmers have adopted practices which the results of the trials show to be sound. No doubt some farmers were unaware of these trials and have based their practice on that of a neighbour or on the results of their own experiments.

In addition to the increased area topdressed other developments include the use of heavier dressings in districts of higher rainfall and the use in these areas of slower-acting phosphatic fertilisers, such as basic slag and ground rock phosphate. A trial conducted at Mahakipawa showed that basic slag if given time to become available was very valuable in that area. Sounds farmers who used ground rock phosphate before the war praise this fertiliser highly. Because of the shortage of sulphur for the manufacture of sulphuric acid alternative phosphates may have to be used on areas now topdressed with superphosphate, and this has prompted the laying down of trials to compare superphosphate with several other phosphates. Observations on current Sounds trials showed lime plus superphosphate to be far ahead of other fertilisers in the first year, but during the second year rock phosphate plus lime had caught up considerably.

TABLE 2—AREA OF PASTURE TOPDRESSED IN MARLBOROUGH

	With artificial fertiliser only acres	With lime only acres	With lime and artificial fertiliser acres	Total area topdressed acres
1936	11,532	767	3,106	15,405
1941	17,902	1,206	9,649	28,757
1946	15,000	6,234	9,741	30,975
1951	39,834	7,560	17,706	65,100
1952	46,126	9,565	17,754	73,445

Although nitrogenous fertilisers were used in early topdressing trials, the use of them in pasture production did not become widespread in New Zealand for three reasons. First, suitable fertilisers were too dear for large-scale use; second, the New Zealand custom has been to rely on clovers to provide nitrogen supplies; and third, the use of sulphate of ammonia caused severe suppression of the clover strains used in the past.

However, in recent years interest in the use of nitrogenous fertilisers for out-of-season pasture production and pasture seed production has quickened and investigations are being carried out to find a suitable fertiliser to provide this nitrogen. Various neutral mixtures of lime and ammonium salts are being tested, and when a suitable nitrogenous fertiliser becomes available its use on the improved strains of grasses and clovers may soon become an important part of pasture topdressing in New Zealand.

Acknowledgment

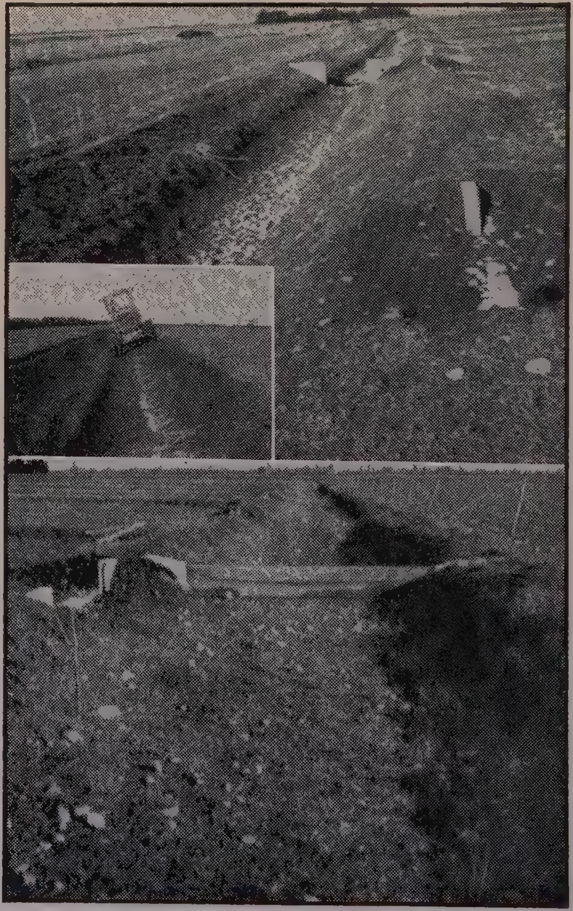
The information on soils was supplied by H. Gibbs, Soil Bureau, Department of Scientific and Industrial Research, Wellington.

Shallow Irrigation Headrace on Ashburton County Farm

By W. A. McKELLAR, Fields Instructor, Department of Agriculture, Ashburton

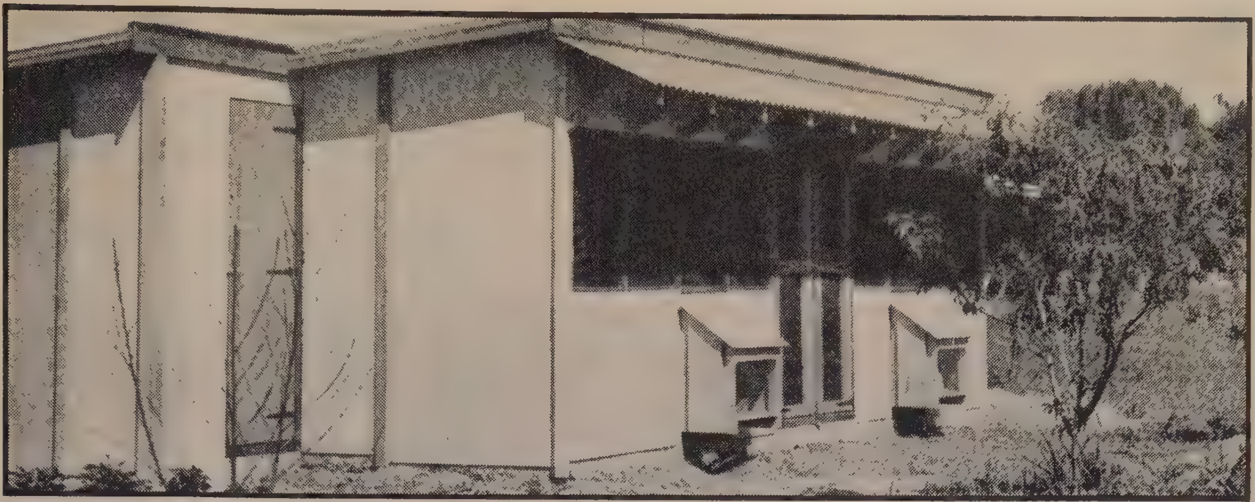
FOR several years a Winchmore farmer on the Ashburton-Lyndhurst irrigation scheme has been interested in simplifying the standard V-type irrigation headrace cut by road graders on Canterbury irrigation schemes. In the V-type race spoil for the racebanks is obtained from the bottom of the V below ground level and the irrigation water travels along the race below ground level. To divert this water through a gate in the headrace on to the border-diked land it is necessary to bank a large body of water in the race bed by using a 12ft. by 6ft. canvas sheet. The volume of water flowing in these races is 8 cusecs, and the tremendous weight of this water on the dam necessitates a heavy wooden framework behind the canvas sheets, which makes the job of shifting the dam a heavy one.

Early in 1951 this farmer requested that a flat headrace be cut for him when the graders were border diking his new area. Spoil for the racebanks was obtained from the surface area near the site of the headrace. The race bed was left flat and made 8ft. wide. Irrigation was carried out from this race during the 1951-52 season and the race was found satisfactory. The farmer found that the shallow, wide headrace allowed him to use lighter frameworks for his canvas dams, which made the dams much easier to pull down the headrace from one headgate to the next. There is less tendency for scouring in the flat headrace, and the bed of the race can be mowed with a tractor if the turf becomes tufty and so impedes the flow of water. In lucerne stands used exclusively for haying, grass growth in the headraces is a serious problem, and a flat headrace that can be mown each time a cut of lucerne is taken would be an advantage. The farmer is enthusiastic about this type of race and does not intend to install any more V-type races on his farm.

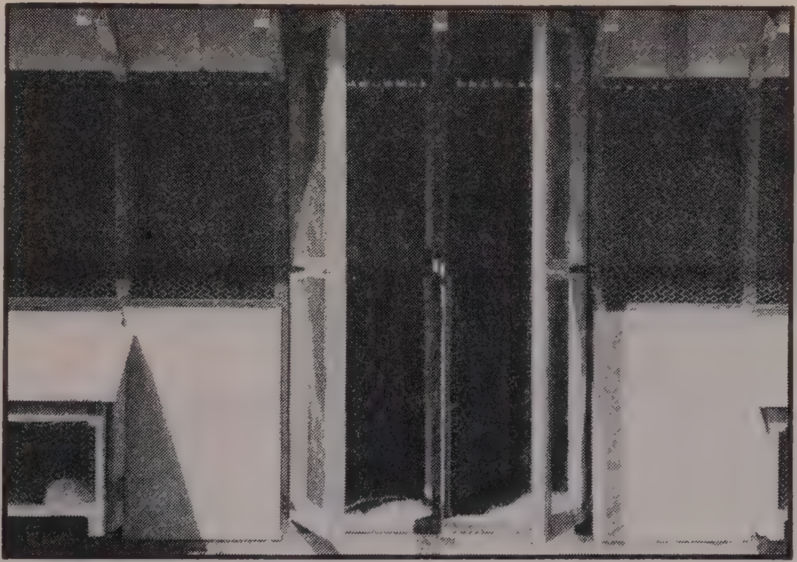


Upper right—A V-type headrace, where water flows below ground level. Inset—A road grader cutting a V-type headrace. Lower right—A flat headrace 8ft. wide of the type described here. The bed of the race is almost level with the surrounding country.

Replacement Policy with Household Poultry



Above and below—Two-unit poultry house. One section is for new season's pullets and the other for birds in their second laying season.



THE problem of providing suitable accommodation for both young and adult stock is often a difficult one for household poultry keepers living in restricted areas. This factor is probably the main reason why so many small poultry keepers retain laying hens of 2, 3, and even 4 years of age when pullets would give a far better return for the amount expended on them. In this month's article for the household poultry keeper, H. K. Mullins, Poultry Instructor, Department of Agriculture, Hastings, discusses the advantages of an all-pullet flock and the housing required to accommodate them.

IT is common knowledge that a hen will lay approximately 3 dozen eggs less in her second year than in her first or pullet year. It should also be obvious that a hen which moults for 10 to 12 weeks including April and May, when eggs are expensive and hard to obtain, is of little advantage to the owner of a small flock. The answer is to rear a complete replacement each year, thus ensuring an adequate supply of eggs the year round.

Procuring Stock

Perching pullets (pullets 8 to 10 weeks old) are comparatively easy to rear and are recommended to household poultry keepers who have not suitable facilities for rearing day-old chicks. Of course the outlay for perching pullets is considerably greater than that for day-old pullets, but where the householder has neither knowledge of chick rearing nor the necessary equipment perching pullets may prove cheaper in the long run. In addition there is little risk with perching pullets of getting cockerels among the pullets as may happen if day-olds are bought. Rearing of day-old chicks that prove to be cockerels is a waste of housing space and adds to the cost of the remaining pullets.

There are several breeds which are capable of good winter production, notably Australorps, Rhode Island Reds, and crossbreds. Of the breeds mentioned, probably none has advanced more in popularity with both backyard poultry keepers and commercial men than the crossbred. An excellent dual-purpose bird, it is ideal for intensive housing, being docile and active. The Australorp is extremely popular, and the Rhode Island Red, provided it is hatched early, can prove a profitable producer of large, brown eggs. White Leghorns, which still outnumber all other breeds in New Zealand, are non-broody, and this factor will continue to weigh heavily in their favour for many years. However, though the breed may be of some importance, it is the strain within the breed that really counts.

Housing

The attractive double-unit house illustrated is 18ft. long by 12ft. deep with accommodation for 20 pullets and 20 yearling hens. In contrast to so many backyard poultry runs it has been built to a carefully prepared plan, with the attractive flower and vegetable garden, indicating that poultry can be kept in a sanitary condition and not become an eyesore to the owner or neighbours. The water troughs are built on the outside of the house, a hinged lid permitting them to be cleaned from outside. A small feed shed, 9ft. deep by 6ft. wide, which can hold 3 or 4 sacks of grain and mash has been incorporated on the end of the shed.

A good, pliable litter should be maintained to a depth of 6in. to 8in. Not only will this provide birds with plenty of exercise, but it will quickly absorb the moisture from the droppings. Shavings, sawdust, or straw make good litter, but if the house tends to become damp, hydrated lime spread on the concrete floor at the rate of 10lb. to 100 sq. ft. will prove very beneficial in keeping the litter dry.

Runs

Runs for poultry are not essential and unless sufficient space can be provided to prevent the land from becoming bare, it is far better to house poultry intensively. If a grassy, sheltered run is available, it should be reserved for the young stock each year. Even then this should not be the sole source of greenfeed for the birds. An adequate supply of silver beet or some such succulent green should be available to the stock each day. During winter good quality fish oil can be used to supplement the vitamin A content of the diet, approximately 3 tablespoons in each 10lb. of meal being used where meal and grain are fed.

Stale, dirty fowl runs are not only a menace to poultry, particularly young stock, but are a source of annoyance to nearby residents. Flies in particular thrive on partly decomposed droppings during the hot months, and permitting hens to forage in wet, muddy runs during winter will not assist production. In addition eggs will be covered in mud and will require cleaning. However, if a run is used, care should be taken to see that all foodstuffs are placed in a suitable trough and not left on the ground, as this will encourage vermin.

Where possible alternate runs should be provided, so that one can freshen up while the other is in use. If during autumn runs can be limed, dug over, and cropped, the ground will not become stale or fowl sick, round worms and coccidiosis will not be encouraged, and the vitality of the stock, young or old, will not be jeopardised.

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to 27 March:—

NORTH ISLAND

January

30 January—Galatea A. and P. at Galatea.

February

*5 and 6 February—Rodney Agricultural Society at Warkworth.

6 February—Katikati A. and P. at Katikati.

6 February—Clevedon A. and P. at Clevedon.

6 February—Woodville A. and P. at Woodville.

6 February—Rangitikei A. and P. at Taihape.

9 and 10 February—Dannevirke District A. and P. at Dannevirke.

12 February—Dannevirke Ram Fair at Dannevirke.

12 and 13 February—Taumarunui and District A. and P. at Taumarunui.

12 and 13 February—Taranaki Agricultural Society at New Plymouth.

13 February—Hukerenui A. and P. at Hukerenui.

*13 February—Waitemata A. and P. at Waiwera North.

13 February—Pahiatua A. and P. at Pahiatua.

13 February—Tauranga A. and P. at Tauranga.

17 February—Te Awamutu A., P., and H. at Te Awamutu.

19 and 20 February—Masterton A. and P. at Masterton.

19 and 20 February—Franklin A. and P. at Pukekohe.

19 and 20 February—Ohura A., P., H., and I. at Nihoniho.

*20 February—Northern Wairoa A. and P. at Arapohue.

20 February—Whangaroa A. and P. at Kaeo.

20 February—Te Puke A. and P. at Te Puke.

20 February—Waiapu P. and I. at Ruatoria.

23 February—Otorohanga A. and P. at Otorohanga.

25 February—Matamata A. and P. at Matamata.

26 and 27 February—Te Kuiti and District A. and P. at Te Kuiti.

26 and 27 February—Wellington and Hutt Valley A. and P. at Upper Hutt.

27 February—Putaruru District A. and P. at Putaruru.

27 February—Whakatane and Rangitaiki A. and P. at Whakatane.

*27 February—Waimarino A., P., H., and I. at Raetihi.

March

3 March—Morrinsville A. and P. at Morrinsville.

6 March—Albany A. and P. at Albany.

6 March—Waikato Central Agricultural Association at Cambridge.

*6 March—Mangonui County A. and P. at Kaitaia.

6 March—Waiotira Junction Show Association at Waiotira.

6 March—Opotiki A. and P. at Opotiki.

13 March—Hawkes Bay A. and P. (autumn show) at Hastings.

13 March—Kumeu District A. and H. Society at Kumeu.

*20 March—Wellsford A. and P. at Wellsford.

SOUTH ISLAND

February

*6 February—Golden Bay Agricultural Association at Takaka.

20 February—Banks Peninsula A. and P. at Little River.

20 February—Murchison A. and P. at Murchison.

20 February—Waiau A. and P. at Tuatapere.

26 and 27 February—Buller A. and P. at Westport.

27 February—Maniatoto A. and P. at Ranfurly.

27 February—Kaikoura A. and P. at Kaikoura.

March

*6 March—Amuri A. and P. at Rotherham.

6 March—Temuka and Geraldine A. and P. at Winchester.

6 March—Mt. Benger A. and P. at Roxburgh.

9 March—Lake County A. and P. (50th Jubilee) at Arrowtown.

13 March—Upper Clutha A. and P. Society at Wanaka.

20 March—Mayfield A. and P. at Mayfield.

27 March—Hawarden A. and P. at Hawarden.

* The Department of Agriculture exhibit will be staged at this show.

Book Review

"Life from the Soil": H. F. White and C. Stanton Hicks

THERE are some interesting practical observations in "Life from the Soil", but the book contains much tedious repetition of the beliefs of the "muck and mystery" school of thought. It is unfortunate that the "organic farming" enthusiasts cannot be content with emphasising the value and need for soil organic matter in the maintenance of soil fertility but must regard organic matter as the one and only means of maintaining the productivity of soils. There are few scientists and farmers who fail to recognise the importance of soil organic matter, but that does not mean that they consider chemical fertilisers as necessarily harmful. The authors of "Life from the Soil" rightly condemn the destruction of soil fertility by repeated cereal cropping, but confuse the issue by inferring that the use of superphosphate on such cereals has hastened the process.

The preface starts with the sentence "The sole object of this text is to create an awareness of the grave danger inherent in taking food production and soil management for granted." A worthy object indeed. The book rightly stresses the importance of pastures in crop rotations, but to say that "My recent work shows me that the British ley-farming practices will completely recover the fertility of the worn-down soils, and will maintain it *without recourse to fertilisers*" (the italics are mine) is to show a lack of appreciation of the role of fertilisers in soil management at least as far as most New Zealand soils are concerned.

The book is in two parts: Part 1, "The Practical Farmer", presumably written by Col. H. F. White, of Bald Blair, New South Wales, and Part 2, "Some Theoretical Considerations", by Sir C. Stanton Hicks, Professor of Human Physiology and Pharmacology, University of Adelaide. Part 1 contains on practically every page lengthy extracts from other writers of the "organic farming" school. It has many glaring inaccuracies such as a reference to red clover on page 51 which states "There is a true perennial type developed in New Zealand, called Montgomery", and a statement on page 50 about perennial ryegrass that "Rye is an easy grass to establish and gives wonderful initial growth and so is very suitable for temporary pastures." The theoretical matter in Part 1 is extensive but by no means wholly reliable.

The theme of Part 2 appears to be largely economic, with particular reference to Australian conditions, and shows the dangers of assuming that increasing world population can be fed without conscious effort to increase food production as well. Problems of human nutrition are discussed, and the author shows a distinct leaning to the "back to nature" school. Unfortunately, however, natural means of food production will not feed the present world population, let alone that of the future, and to get the quantity of food required artificial means must be used even if they include the use of fertilisers. But Sir Stanton Hicks puts forward little real evidence that food quality, from the viewpoint of human nutrition, has really deteriorated through the use of these artificial methods of food production.

In some respects this is an interesting book. It is unfortunate that the valuable information it contains is so mixed with contentious matter that the ordinary reader will be left in a state of confusion.

—*P.B.L.*

Longmans Green and Co. Ltd., Melbourne. 30s.

Synthetic Soil Conditioners

By G. R. MOSS, Fields Instructor, Department of Agriculture Seed Testing Station, Palmerston North, and H. A. BROWNING, Research Officer, and T. F. SOUTHON, both of the Department of Agriculture Soil Research Station, Rukuhia

THE discovery of satisfactory synthetic soil conditioners has been received with interest in all parts of the world and their commercial production has been accompanied by much publicity. Products such as "Krilium"* have been the subject of many popular articles and much discussion. As soon as samples of these materials were available tests were begun on a range of New Zealand soils. The results of these preliminary tests have been promising, and this work will be followed up by more extensive trials at an early date. Although most of the work summarised here was undertaken with the material known as "Krilium", other products are being tested as they become available and the results from these further trials will be made available as soon as possible.

THERE appears to be great confusion about what these conditioners are capable of doing. As they are now being released on the New Zealand market, an attempt is made in this article to summarise some of the latest findings about their usefulness and limitations.

Soil Structure

All farmers and gardeners are well aware that organic matter plays an essential part in producing in the soil the structure so desirable for a high-quality seed-bed. Farmers know that an old pasture, with its mat of root materials, is far easier to plough and work up into a good seed-bed than land that has been cropped. There is a build-up in fertility under pasture which is lacking under arable conditions.

Temporary tilth can be worked up by cultivation, but it lacks the stability of that in a soil containing ample organic matter. Organic build-up results from plant and animal decay both above and below the ground as well as from the increase in soil micro-organisms living on this decaying matter. A number of substances resulting from the decay of these plant and animal fractions resolve into a semi-resistant mass known as humus. Among the substances which go to make up this complex humic mass are certain plant-gum materials, which are given the name of soil conditioners. These substances increase the crumb structure of the soil by binding together the soil particles into aggregates so that the plant roots have more air and greater surface from which to draw their food.

Soil conditioners are not plant foods—they yield nothing of themselves to the plant—but by altering the soil structure they make more oxygen, water, and food available. These naturally produced gums can be decomposed by micro-organisms, and unless the organic matter in the soil is constantly replenished, these conditioners will gradually disappear.

Micro-organisms weaken the forces binding the soil particles into crumbs and the soil loses structure. By the use of artificial soil conditioners it is hoped that soil structures can be stabilised for a far greater period than previously. A claim has been made that as "Krilium" is highly resistant to microbial attack, its structure-stabilising effects should last up to 30 times as long as those of organic manures. As artificial soil conditioners are still in their infancy, this has yet to be proved under field conditions.

Overseas Developments

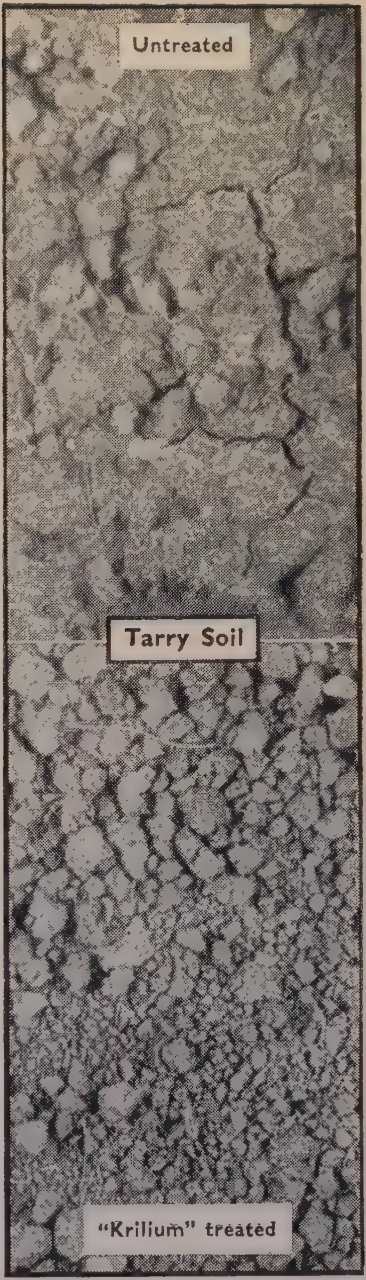
Some experimental work on an artificial soil conditioner had been carried out at Rothamsted Experimental Station in England in 1947, but it was not until "Krilium" was announced in December 1951, by the Monsanto Chemical Company of the United States, that the first commercial product was developed. This new product is a synthetic, water-soluble resin which shows spectacular power for improving the structure of soils with a high clay content. Since the development of the original "Krilium" a new form of product has been developed known as "Krilium Merloam" or simply "Merloam".†

Another soil conditioner, "Flotal", produced by an Italian company, is likely to appear on the New Zealand market. It has been recommended for alkaline clay soils. It is entirely different from "Krilium", being a mixture rather than a single synthetic product.

One pound of "Krilium" is claimed to have the same effect in improving soil structure as the natural conditioners produced from the decomposition of 100 to 1000lb. of plant residues. "Krilium", a powder, readily absorbs moisture from the air and becomes sticky. If applied to a wet soil, it sets into rubbery lumps and because of this it is important that it should be worked up in a dry soil. To improve the structure of a soil from 6 to 8in. deep, over 1000lb. of "Krilium" per acre is needed in extreme cases. American reports claim that as little as 200lb. per acre when disced into the soil has changed a hard, cloddy, crusty soil into one suitable for a garden.

Cost

At present "Krilium" retails in New Zealand for about 28s. per pound and "Krilium Merloam" at about 13s. The commercial recommendations are that 1lb. of "Krilium" will condition 80 sq. ft. of soil 3in. deep and that 1lb. of "Merloam" will condition 16 sq. ft. 3in. deep. The present price of these products makes them too expensive to use on a farm scale.



Under the system of grassland farming practised in New Zealand there is no place for soil conditioners, but they may have a place in intensive arable farming. For the horticulturist or home gardener with his small plot of intensively worked soil, synthetic conditioners will prove invaluable in such situations as glasshouse soils and seed-beds. The soil conservator has also been shown that certain surface soils can be satisfactorily stabilised to the erosive action of rain by suitable treatment. Here again the economics of the position need close examination.

---

* "Krilium" is the trade name adopted by the Monsanto Chemical Company for such artificial soil conditioning substances as C.R.D.-189 (the sodium salt of a hydrolysed polyacrylonitrile) and C.R.D.-186 (another carboxylated polymer used as a partial calcium salt).

† "Merloam" is a calcium salt of a vinyl acetate/maleic acid copolymer and not the polyacrylic acid product as was the original "Krilium".

WHAT IS A VALUER ?

Prudent buyers and sellers act only upon the advice of a Registered or Public Valuer. The Registered or Public Valuer makes valuation for rates, rents, taxation purposes and all matters connected with Real Estate. In 1948, the Government created the Valuers Registration Board and only men of high integrity, ability, experience and qualifications are granted registration. Thus the public are protected by dealing only with a Registered Valuer or Public Valuer. Professional examinations are held annually and a university course is available.

The Institute publishes a quarterly journal devoted to current valuation problems with articles contributed by leading men in the profession.

New Zealand Institute of Valuers,

General Secretary, P.O. Box 986,
WELLINGTON.

If you switch to

DRY DRENCHING

with "PHENOVIS"

Phenothiazine Pellets

You'll Drench Quicker And Minimise The Risk Of Wool Staining.

THIS scientific phenothiazine DRY drench has won New Zealand-wide praise.

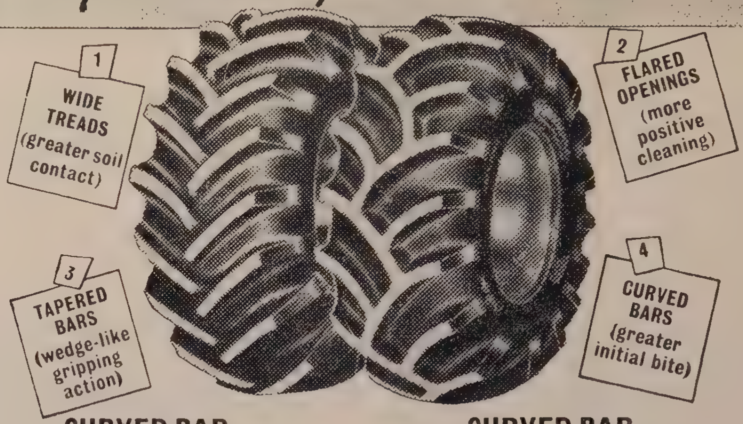
"PHENOVIS" Pellets are safe, accurate, labour-saving. Accurate dosage is certain because each contains exactly 5 grammes of phenothiazine. The dose, given by a special instrument, ensures no "spit-out" and minimises risk of wool staining during drenching. Easier to carry than heavy liquids—and there's much less chance of waste. Order now for the season ahead.

Distributors:

SUMMIT PRODUCTS LTD.

Box 328, Palmerston North.

Only your TYRES can harness your tractor power to the Soil!



CURVED BAR OPEN CENTRE

If your soil conditions require an open centre tyre use the most advanced open centre tyre on the market—the Firestone Curved Bar! Tread Bars are Curved and Tapered to take a sharper, stronger bite; and flared to permit more positive self-cleaning.

CURVED BAR TRACTION CENTRE

Thousands of farmers the world over use the famous Firestone patented Traction Centre tyre because they've found that this tyre performs best in the soil conditions on their particular farms. The Firestone Curved Bar Traction Centre may be the answer to your problem.

Firestone CHAMPIONS

Fit Firestone for *outstanding* tractor performance.

T7.2C

Favourite SEED SAVER everywhere!

Case 6-Foot Model "A" Combine

Because it has proved itself the world over in 112 different crops; because it does unexcelled work in tiny mustard and clover seeds—fluffy grass seeds—big, fragile beans; saves every possible grain of wheat, oats, rye—gets all grains and seeds clean with little kernel damage—the Case 6-foot Model "A" Combine is a favourite all over the world. Easy to own and operate. Ask for details.

DISTRIBUTORS

JOHN CHAMBERS & SON LIMITED, Sole N.Z. Agents: Auckland, Wellington, Christchurch, Dunedin, Invercargill, Timaru, Hamilton, Palmerston North, New Plymouth, Ashburton, Nelson, Whangarei, Hastings, Oamaru.

It pays to farm with CASE

G5464 9

Overseas Trials

The Agricultural Research Council of Great Britain has published a brief summary of the results of tests carried out at several agricultural research institutes throughout the country during 1952 with the original "Krilium". No definite conclusions can be drawn from the results at this early stage, as there are so many questions which have still to be answered. The initial findings can be summarised as follows:—

1. In many of the soils treated improvement in structure was apparent.
2. The uptake of plant foods from the soil was not adversely affected.
3. The activity of the soil micro-organisms was normal.
4. No conclusive evidence was obtained that the application of "Krilium" caused any significant increase in crop yields of field or glasshouse crops, though in certain cases increased yields were recorded.

In the United States it was also found that not all crops responded to treatment, but yields of maize, oats, and carrots increased appreciably.

Trials in New Zealand

At the Rukuhia Soil Research Station the effect of "Krilium" on the structure of several New Zealand soils has been examined both by physical means and by pot experiments with mustard as the indicator plant. The material was applied at 1 part per 1000 parts of soil. The soils used were mostly of heavy texture.

Results have so far been favourable and have shown that "Krilium" is capable of effecting a useful improvement in crumb structure and drainage and, through this, improvement in the crop. Under wet winter conditions the effect of "Krilium" is more pronounced than when conditions are more favourable.

One series of trials consisted of a test crop of mustard growing in 2lb. pots of soil. Soil treated with 1 part of "Krilium" per 1000 parts of soil was compared with pots of untreated soil. The pots were left exposed to the weather to subject them to the action of rain drops and extremes of moisture. Adequate drainage from the bottoms of the pots was provided.

On Wharekohe silt loam, a gumland soil from North Auckland which becomes compacted and sticky in winter, the average green weight of mustard grown per pot of untreated soil was 4.5 gm.; that on "Krilium" treated pots was 16.1 gm. At the conclusion of the trial the untreated soil had settled to a hard, compact mass with a moss-covered surface, and drainage and aeration were obviously poor. The "Krilium" treated soil, on the other hand, had increased in volume and had a light, friable surface free from moss. On the Wharekohe silt loam lime gave a greater increase in crop weights than did "Krilium". However, lime plus "Krilium" gave the highest production.

Another soil type used in this trial was obtained from the Ahuriri Lagoon, the recently reclaimed tidal flat area near Napier. This soil was well supplied with most plant nutrients, but because of poor structure and saline conditions it was hard to cultivate. Although pot trials with one of the heavier phases of this soil are still incomplete, it is evident that treatment with "Krilium" can give some improvement in both soil structure and productivity.

Tarry soil from near Oamaru was also used in the trials. This is a highly fertile soil which forms into hard clods when worked under wet conditions. The untreated pots of this soil produced an average of 4.5 gm. of green mustard whereas the "Krilium" treated pots produced 13.5 gm. The difference in the surface soil between the two sets of pots was most striking. Untreated pots had a hard, cracked surface and "Krilium" treated pots were loose and crumbly.

Hauraki clay, a heavy clay from the Hauraki Plains, was also treated with "Krilium", but in these trials, although drainage was improved, crop weights were little affected.

Effect on Seedling Emergence

Surface crusting is an important factor in seedling emergence, and in these trials "Krilium" increased the germination and the number of seedlings which survived on some soils. Analysis showed that the proportion of water-stable particles or crumbs was increased by treatment with "Krilium". This is indicated clearly by Table 1, which shows that "Krilium" treatment increased the percentage of the larger particles and decreased the percentage of the smaller.

"Krilium" has been tried with some success as a spray to condition a narrow strip along the seed row. This method greatly reduces the amount of "Krilium" required and may prove a practical method of preventing surface crusting over young seedlings in market gardening.

Trial on Hamilton Clay Loam

A small field trial was laid down in spring 1952 on Hamilton clay loam soil with a gradient of approximately 1 in 10 typical of market garden areas in the district. This is a soil of good structure except when wet, when it becomes sticky and unworkable.

TABLE 1—PROPORTIONS OF SOIL PARTICLES OF VARIOUS SIZES

Soil type	Diameter of particles				
	Over 2 mm.	2-1 mm.	1-½ mm.	½-¼ mm.	Under ¼ mm.
Wharekohe silt loam:					
Untreated	41	6	2	4	47
"Krilium" treated ..	60	12	3	3	22
Ahuriri Lagoon:					
Untreated	30	10	3	6	51
"Krilium" treated ..	37	10	4	8	41
Tarry soil:					
Untreated	64	9	3	4	20
"Krilium" treated ..	72	17	4	3	4

A plot 5ft. x 5ft. with 1lb. of "Krilium" worked in to the top 6in. was flanked by two similar, untreated plots and apparatus for measuring the run-off of storm water from each plot was installed. Manurial and lime treatment was the same for each plot. Crops of radish, early peas, lettuce, and carrots have been taken. Broad beans are growing and will be followed by sweet corn. All yields have been good, with a slight advantage to the treated plot. Germination has been satisfactory in all plots, but was more even in the treated area and growth there was also more uniform in the rows. As may be seen from Table 2, an impressive difference is found in the run-off measured after frequent heavy rains.

TABLE 2—"KRILIUM" TRIAL ON HAMILTON CLAY LOAM: MEASUREMENTS OF WATER RUN-OFF AFTER HEAVY RAINS

Date of reading	Control plot	"Krilium" plot	Control plot
	lb.	lb.	lb.
6 October ..	15.4	15.4	16.7
2 December .	0.9	0	11.0
10 December .	14.2	10.3	17.0
2 February .	33.2	2.7	31.8
9 April ..	No reading	0	7.0
5 May ..	3.0	0	9.4
27 May ..	34.9	8.4	50+*
9 June ..	50+*	7.3	50+*
14 June ..	6.6	0	9.8
10 July ..	24.0	5.0	13.5
Totals ..	182.2	49.1	216.2

* 50+ = container overflowed.

Note: A cloudburst on 5 July flooded all containers from outside and no recordings were taken.

Other effects noticed on treated plots have been easier cleaning of root crops from adhering soil, and a more crumbly surface with no formation of surface pan and cracking after heavy rain. There is also a spongy feel under the pressure of the hand that is absent in the controls.

Though cost at present precludes the use of soil conditioners on a large field scale, the use of a suitable conditioner on garden plots or soils that are inclined to become waterlogged and sticky is well worth a trial, provided other fertility requirements have been met. It is also probable that with the help of soil conditioners winter crops may be grown on otherwise unsuitable soils, since drainage and aeration can be improved.

Conclusion

"Krilium" is suitable only for soils with a high clay content; sandy and loamy soils have shown no response. Synthetic soil conditioners cannot take the place of organic manures or legumes, as they do not supply the plant with any form of food. If greater yields are to be expected, more plant nutrients will be required, thus more manures will be necessary. Even though the structure stabilised by synthetic conditioners is resistant to microbial attack, the stability can be destroyed by overworking in exactly the same way that any normal soil structure can be destroyed by faulty cultivation. Synthetic soil conditioners are still in the early stages of development. There is a lot to learn yet, but it is evident that a new tool is at hand which may play a major part in increasing world food production.

Care of Livestock during February

Contributed by the Animal Research Division

PREPARATIONS FOR TUPPING

IF ewes have been held on short pasture since weaning, they should now be in good hard condition. About 21 days before tupping they should be crutched and given the best pasture available. Experiments at the Department of Agriculture's Animal Research Station, Ruakura, have shown that flushing ewes for 3 weeks before tupping and keeping them on good pasture for 5 weeks after tupping begins increases the number of lambs marked by 20 per cent. Further advice concerning flushing will be found in an article by J. C. Gerring in this issue. Rams, too, should be crutched and flushed for about 3 weeks before tupping. They should be dipped before the flushing period, as dipping too close to tupping appears to reduce ram fertility.

COBALT DEFICIENCY

Bush sickness can be prevented completely by topdressing annually with cobaltised superphosphate, and in the North Island at least this is best applied in the usual autumn topdressing. Cobaltised superphosphate prepared in North Island works contains 3lb. of cobalt sulphate per ton; 2cwt. of this fertiliser contains sufficient cobalt for 1 acre. In the South Island cobaltised superphosphate contains 6lb. of cobalt sulphate per ton, and 1cwt. of this fertiliser per acre contains sufficient cobalt. If greater quantities of fertiliser than those indicated are used, the additional amount need not be cobaltised. For fuller details consult the Department of Agriculture's Bulletin No. 180.

SOWS AND WEANERS

Sows with litters should be fed at the rate of 4 gallons of milk plus 2/3 gallon per pig suckled. Sows and litters should be allowed at least 2 hours' grazing per day. It is an advantage to provide water sprays for both suckling and dry sows during summer, as since pigs possess very few sweat glands, they can be kept cool only by the evaporation of water from the skin. Litters over 3 weeks of age must have milk and meal available at all times. Observations at Ruakura have shown that piglets suckle at intervals of 75 to 90 minutes throughout the 24 hours, and after the sixth week they visit the creep after each suckling. Good creep management can add 6 to 10lb. per pig to the weaning weight. Weaned sows must be well fed to ensure successful mating. A ration of 4 to 6 gallons of milk daily plus grass is essential. Weaned pigs should be fed 1½ to 2 gallons of milk daily. If the milk available is not sufficient to provide this, the feeding of meal to supplement the milk ration, replacing 1 gallon of milk with 1lb. of meal, is highly profitable at the present meal and meat prices.

FACIAL ECZEMA

If warm rains fall in February after a spell of hot, dry weather, facial eczema is likely to occur in districts which are usually affected. Experience during recent years has shown conclusively that the disease can be prevented by shutting sheep up at the rate of at least 100 to the acre as soon as the rains fall and keeping them so confined until the weather becomes either hot and dry or much cooler and the pasture visibly hardens. If dry periods occur, plans should be made for action along these lines: Good hay at the rate of 2lb. per sheep per day will prevent loss of condition. If crops of rape, kale, turnips, or chou moellier are available, they can be grazed safely during the dangerous period. The grazing of such crops is the only satisfactory way of preventing the disease in lambs, which react badly to restricted grazing. Lucerne has not proved safe, possibly because ryegrass is frequently present in it as a weed.

[An article dealing with the prevention of facial eczema appears on page 31.]

CARE OF CALVES

Autumn is a critical period for calves. Deaths during winter can be eliminated by rotating the calves through the paddocks ahead of the cows at intervals of 3 or 4 days. If this is not being done, it should be begun immediately. Calves treated in such a way will be up to 100lb. heavier as yearlings than those kept confined in a calf paddock. If calves are unthrifty and scouring, it may be necessary to give 2 or 3 doses of phenothiazine at 3-weekly intervals, but this is seldom necessary with calves which are rotationally grazed.

COPPER DEFICIENCY

Scouring in cattle and staggering in lambs grazing on peat land can be prevented by topdressing the pastures in autumn with 5lb. of bluestone per acre. Copperised superphosphate is now available or the bluestone may be mixed with lime.

PULLORUM DISEASE IN POULTRY

Preparations should now be made for the autumn hatch by blood-testing the flock for pullorum disease and by cleaning and fumigating the incubators. A vacuum cleaner is ideal for cleaning, and advice on fumigation may be obtained from the local Poultry Instructor.

COWS RETURNING TO THE BULL

If several cows return to the bull at long irregular intervals and some abort early in pregnancy (2 to 3 months), trichomoniasis may be the cause, and veterinary advice should be sought. There are many different reasons, apart from trichomoniasis, for cows failing to get in calf at the desired time. Any one or a combination of causes can result in herd infertility which may be impossible to correct during the short mating period. A diagnosis now will help in preventing similar trouble next season.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during November and for the 4 months ended 30 November 1953, with comparative figures for the same month and 4-monthly period of 1952, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery	Tons Whey	Total	Percentage Inc. or dec.
November 1953	22,341	423	22,764	—
November 1952	22,364	402	22,766	—
Increase or decrease ..	—23	+21	—2	—0.008
4 months ended 30/11/53	69,104	1,268	70,372	—
4 months ended 30/11/52	71,186	1,208	72,394	—
Increase or decrease ..	—2,082	+60	—2,022	—2.793

Butter in store at 30 November 1953 was 15,149 tons

CHEESE

Period	White	Tons Coloured	Total	Percentage Inc. or dec.
November 1953	14,434	—	14,434	—
November 1952	14,101	37	14,138	—
Increase or decrease ..	+333	—37	+296	+2.094
4 months ended 30/11/53	35,951	29	35,980	—
4 months ended 30/11/52	36,171	56	36,227	—
Increase or decrease ..	—220	—27	—247	—0.682

Cheese in store at 30 November 1953 was 13,025 tons

If these figures are converted into butterfat equivalent, there is a decrease of 2.404 per cent. in butterfat graded for the 4 months as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Summer and Autumn Supplementary Feeding Crops

Seasonal Notes by the Extension Division

DRY periods in late summer and autumn necessitate the provision of supplementary feeding crops. Catch crops of green cereals are commonly used in the arable farming districts, especially when pasture growth and turnip and rape crops have suffered from dry weather. Catch crops of oats, barley, and ryecorn are the most reliable means of providing feed in an emergency. Cereals are relatively cheap and easy to establish, do not require exacting seed-bed preparation, and do not require heavy applications of fertiliser. They quickly produce a bulk of succulent herbage and offer a choice of species and varieties to overcome variations in soils and climate, sowing dates, and feed requirement periods.

GREENFEED CEREALS

AUTUMN-SOWN greenfeed cereals generally follow grain or pulse stubbles or, occasionally, a summer fed-off crop such as rape. Except on very heavy soils, exceptionally weedy land, or tall stubble, discing and harrowing usually provide sufficient tilth, which should be fine below but rubbly on top. Heavy and weedy ground is best ploughed before discing or other cultivation; long stubble should be burnt off preparatory to cultivation. Where greenfeed follows grass deep ploughing is normally essential. A short fallow after a lea is preferable, though not essential. When sowing is being done the seed should be drilled and superphosphate applied at 1 to 1½cwt. per acre.

OATS AND BARLEY

Oats are the most popular winter greenfeed cereal and provide the greater bulk of herbage if they are sown early. Algerian and, to a less extent, Duns and Winter Greys are the chief greenfeed oat varieties. Duns are more winter hardy but less productive and slightly slower growing than Algerian. Winter Greys are intermediate in growth habit. Seeding rates vary between 2½ and 3 bushels per acre. Oats should be sown in February-March for feeding from May to August. Though they recover satisfactorily from grazings, they tend to become fibrous and less palatable in spring. For quick feed or for later sowings (April-May) Cape and Black Skinless barleys are more suitable than oats. Both varieties recover well if not severely grazed. For subsequent recovery and early spring feeding Wong is a superior variety, though initially slow to establish. Seeding rates are as for oats.

—A. R. DINGWALL

* * *

RYECORN

AUTUMN and spring supplementary greenfeed should now be receiving consideration. In Otago ryecorn is a reliable crop for lamb fattening, autumn flushing of ewes, and spring feeding of the ewe flock. Sowing seed of inferior strain or poor germination, wrong sowing dates, and incorrect management have caused some disappointments. Certified seed of the N.I.A.B. strain is now available and high-germinating lines of this variety should be sown for best results. Ryecorn germination deteriorates rapidly and a check should be made, particularly when seed is more than 1 year old. The purpose for which the greenfeed is required largely governs sowing dates, but crops sown in spring and early summer seldom provide useful feed before shooting to seed. For lamb fattening two sowings should be made 2 weeks apart, the first 6 weeks before feeding. Sowing in February and early March will provide good flushing feed; crops for spring feed may be sown as late as April. Highest production will result from thorough seed-bed preparation, but ryecorn will tolerate comparatively adverse conditions. Pure seedings of 2 bushels per acre are adequate, but for sowings made before March 1 bushel of ryecorn with 10 to 15lb. of short-rotation or Italian ryegrass has proved a good alternative. At least 1½cwt. per acre of phosphatic fertiliser should be sown. The crop should be grazed when growth is not more than 3 to 4in. high, and quick, close grazing interspersed with brief spelling is the ideal grazing management.

—S. M. J. STOCKDILL

* * *

SILAGE FOR MILK PRODUCTION

SILAGE will sustain full milk production if it is of sufficiently high quality and is fed in sufficient quantity. By quality is meant silage of high protein content (above 10 per cent. protein). This class of silage can be made only from grass cut at the succulent stage before seed head formation. Silage made from pasture already too long and stalky for grazing is most unlikely to be of the quality necessary to sustain full milk production. The earlier made silage is more likely to fall into the category of high-quality silage than later cuts. It follows, therefore, that this higher-quality, early cut silage should be fed in summer for milk production and that the later cuts consisting of more mature material should be kept as a maintenance feed for winter. Feeding of silage should begin while there is still ample growth available. In this way the available pasture is eked out, overgrazing is avoided, and pastures are quicker to recover when conditions become more favourable. Milking cows should be fed silage just after milking, the quantity ranging from 10 to 60lb., depending on available grass. Silage spoils on exposure to the air, so no more than the amount required by the stock should be fed out at a time.

—G. L. BANFIELD

* * *

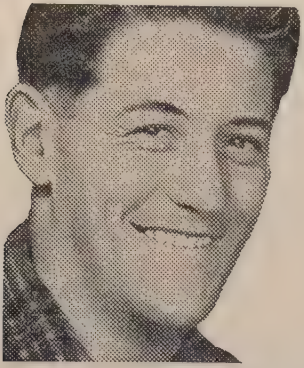
SEED-BED FOR AUTUMN GRASS

THE successful establishment of a new pasture depends to a large extent on how well the seed-bed has been prepared. In North Island dairying districts autumn pastures usually follow a summer forage crop and are taken after soft turnips, chou moellier, or maize. Soft turnips are usually fed in February, chou moellier in late January to March, and maize in February-March; and pastures are sown down after these crops in March-April. Grass to grass is another method used. The land is then ploughed in December, care being taken to consolidate the seed by rolling on the furrow after ploughing (this stops the turned-in grass from regrowing) and rolling well before sowing.

CONSOLIDATION OF SEED-BED

A seed-bed for grass should be fine, firm, moist, and warm at the time of sowing. Firmness is essential, especially for clover establishment. After a summer crop has been fed off the land is well consolidated and all the cultivation usually required after soft turnip or chou moellier crops is a light discing and harrowing. Any levelling required can be done then and the area harrowed and rolled continuously to kill the germinating weeds and also to encourage moisture retention until the area is ready to be sown. With the grass to grass method a double discing on the fallowed land, followed by repeated harrowings and rollings, will form a good seed-bed. The seed is best sown on a rolled surface and covered with the chain harrows where the surface is rubbly, or brushed with sacks or scrub attached to the topdresser where the soil is fine.

—N. A. CLARKE



TRUCK
OPERATOR'S EXPERIENCE

"Ford Batteries stand up best to the heavy drain from commercial work."

Ford
Ford
Ford
Ford

Six types, 9 to 15 plates. From Ford Dealers, leading garages and service stations.

THE POWER PLUS BATTERIES
FOR EVERY MAKE OF CAR,
TRUCK, TRACTOR

FORD MOTOR COMPANY OF
NEW ZEALAND LIMITED LOWER HUTT

251.9

"Cooper" Brand Drenches Are Your Safeguard

THERE IS A COOPER DRENCH TO MEET YOUR REQUIREMENTS WHATEVER THEY MAY BE

COOPAZINE POWDER provides phenothiazine in its most economical form. 1lb. drenches 20 to 30 sheep or 10 to 20 cattle. Packed in 1lb. and 10lb. tins.

COOPAZINE LIQUID comes to you ready to use in a convenient tin for carrying. Remains in suspension during drenching. 1gal. sufficient for 106 to 160 sheep or 53 to 106 cattle.

COOPAZINE TABLETS for quick, clean drenching. 3 tablets for lambs and 5 for adult sheep.

COOPER'S N.C.A. DRENCH Containing Nicotine, Copper-Sulphate in scientifically combined form. 16oz. bottle sufficient for 160 sheep or 426 lambs, or for 80 to 320 cattle according to age.

COOPER'S FLUKE and WORM DRENCH
Containing Carbon Tetrachloride, is the recognised remedy for Liver Fluke. ½ and 1 gallons.

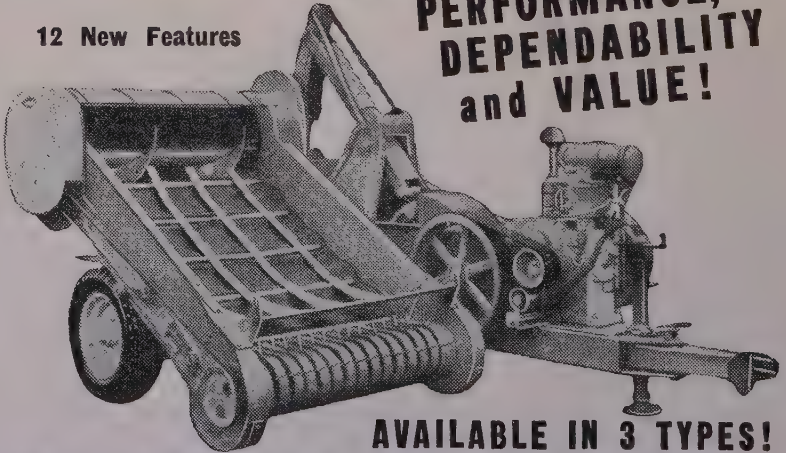
Obtainable from Merchants, Stock and Station Agents, or write:

COOPER McDOUGALL & ROBERTSON (N.Z.) LTD.
Box 599 - - - - - - - - AUCKLAND

NEW Design makes SALOPIAN ONE-MAN FULLY AUTOMATIC PICK-UP BALERS

...UNBEATABLE for PERFORMANCE, DEPENDABILITY and VALUE!

12 New Features



AVAILABLE IN 3 TYPES!

THE DOMINION MOTORS LIMITED
Wellington, Auckland, Christchurch, Timaru, or any Authorised Dealers.

Risk of Eye Injuries on Farms

LAST year a farmer suffered a severe and painful injury to the eye when some highly concentrated phosphatic fertiliser was inadvertently blown into his eye while he was assisting the ground crew to reload an aerial topdressing aeroplane. The farmer was not wearing goggles at the time, his assistance being of a temporary nature while one of the ground crew was absent for a short time. The ground crew and the pilot habitually wore goggles while handling this fertiliser.

THE eye injury was so severe that partial blindness resulted and treatment was obtained from an eye specialist. In all, it was 6 weeks before the farmer regained his eyesight fully. The eye specialist who treated this case is almost certain that the injury was a chemical one and not a mechanical injury—that the chemical was absorbed through the outer coat of the eye and caused acute inflammation of the iris.

All high-analysis fertilisers contain a high proportion of water-soluble salts. All salts are caustic to some degree and as these fertiliser salts are water soluble, they would cause severe irritation and acute discomfort to the eye. Thus it is essential for those handling these concentrated fertilisers to wear goggles at all times.

Early Treatment Important

In cases of chemical injury to the eye, the eye should be washed out immediately. Speed is essential and placing the affected person's head under a tap promptly may save his eyesight. If the accident occurs where no taps are available, a teapot, billy, or jug may be used to pour water into the eye, the lids of which must be held open to allow the liquid to move over the surface of the eye to flush away the chemical. Washing for some minutes is desirable, after which medical treatment should be obtained.

Acids and Alkalis

Acids and alkalis, particularly if used in concentrated form, can cause serious eye injuries. The immediate treatment for splashes in the eye should be to wash the eye with water; speedy and prolonged washing with water is by far the most important first-aid measure for any irritant.

Water is more likely to save eye damage by chemicals than any antidote, and moreover time may be wasted in looking for the antidote, whereas water is usually within easy reach on many parts of the farm. No ointment or other substance should be introduced into the eye which has been splashed with dangerous chemicals unless the treatment has been advised by an eye specialist.

Attention to Injuries

FARMERS should visit a doctor or hospital at once if an eye injury involves any of the following:—

- Loss of vision.
- A large wound.
- A particle firmly embedded in the eye.
- A possible perforation of the eye.
- A splash from hot metal.
- A splash from a corrosive metal.

First Aid

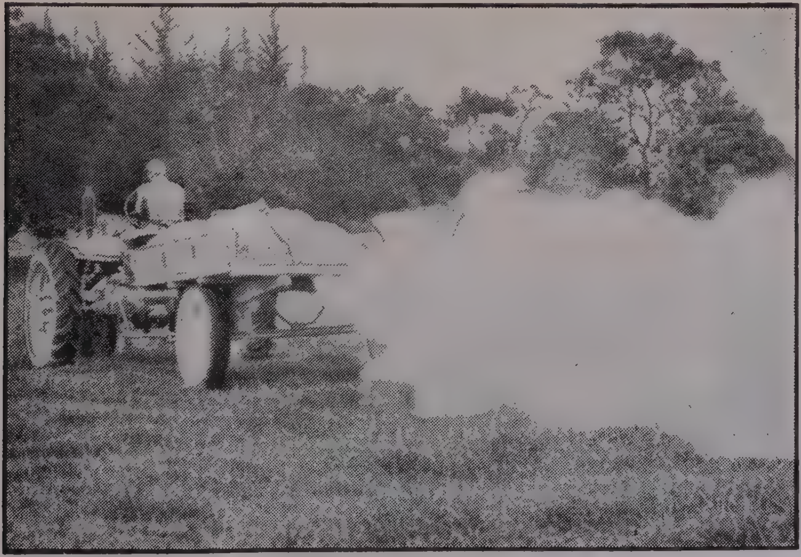
With any chemical splash wash out the eye as quickly as possible with plenty of warm, clean water.

Be gentle and use a good light.

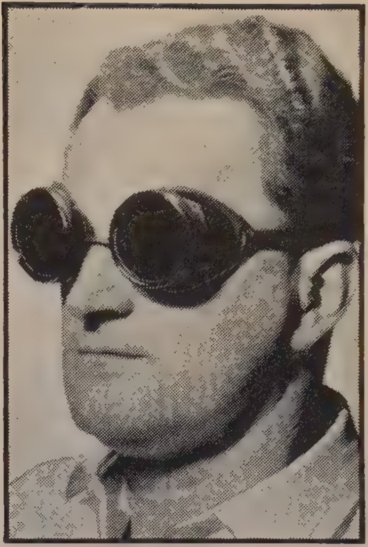
Use a magnifying glass to detect small particles.

Wash out dirt in the eye with a teapot.

Wipe off loosely adhering particles with a plastic loop or camel-hair brush.



Farmers are urged to use goggles during topdressing.



Cup goggles.

Spray Materials

The precautions which should be taken when spray materials are being used were discussed in the article "Health Aspects of Plant Therapeutants", by H. Jacks, which appeared in the July 1952 issue of the "Journal". Dangers associated with organic phosphorus materials particularly were dealt with by the same author in an article on page 371 of the October 1953 issue.

Use of Goggles

Because of the risk of eye injuries farmers are urged to wear suitable goggles when doing metal work, mixing sprays, handling fertilisers, or cutting hedges which are potentially dangerous such as gorse. It is suggested that at least they should wear plastic eye shields, but effective protection is given only by goggles of the correct type for the work being done and those which fit the wearer. It is poor economy to buy cheap goggles, which may not give adequate protection. The farmer when ordering goggles should explain the purpose for which they are to be used.

Cup goggles or rubber goggles with indirect ventilation are recommended: 1. For protection against dust such as that from lime, cement, and fertiliser. 2. Where there is risk of splashes from irritant or corrosive chemicals.

Spectacles with hardened lenses, plastic face shields, or one-piece goggles are recommended for lathe work, grinding, polishing, etc.

Care of Goggles

Goggles should be kept in good order. Dirty or cracked lenses are likely to lead to goggles being discarded, and cracked lenses are a direct risk. Periodically goggles should be scrubbed in hot soapy water and hung up to dry. A little glycerine in the rinse water will restore the gloss to the rubber part. Lenses can be treated with an anti-dim preparation to prevent misting up.

Recent Research Work

Foliar Spray Application of Phosphates

FOR many years it has been realised that the greater portion of any application of phosphatic fertilisers becomes fixed in the soil in a form more or less unavailable to plants. So far research has failed to discover any practical method which will overcome this inefficiency in the utilisation of phosphates. Recently considerable interest was aroused by a report from overseas that foliar spray applications of phosphates combined with nitrogen and the hormone weedkiller M.C.P.A. had resulted in marked increases in pasture production by comparison with production from pastures normally topdressed. These experiments, however, have been conducted on low-lying meadows and estuarine rush marshes seriously deficient in lime and phosphates. A short time ago the Monsanto Chemical Company produced a rapidly soluble 20-20-20 fertiliser called "Folium", which contains 20 per cent. of nitrogen, 20 per cent. of phosphoric acid, and 20 per cent. of potassium oxide and which is intended for spray application to grass, flowers, vegetables, shrubs, and trees. Radio-active tracer tests show that it is absorbed by the leaves of plants 30 minutes to 2 hours after application and thereafter moves throughout the plants. This product is not yet on sale in New Zealand, but will be tested this year.

TRIAL AT RUKUHIA

A TRIAL was established at the Department of Agriculture's Rukuhia Soil Research Station in September 1952 to investigate whether pasture species can absorb soluble phosphates applied in a spray to their leaves and, further, whether plants can utilise them better than phosphates topdressed in the normal way. The trial is being carried out on Horotiu sandy loam, a soil which is "high-fixing" (that is, it rapidly fixes applied phosphates in an unavailable form), of low phosphate status, and only slightly acid. Several forms of inorganic and organic phosphates were sprayed on to pasture in relatively concentrated solutions containing from 10 to 20 per cent. of phosphoric acid (P_2O_5). To avoid wastage of materials by run-off the rate of application was between 10 and 20 gallons per acre.

TABLE I—MATERIALS AND RATES OF APPLICATION PER ACRE

	Phosphoric acid lb.	Nitrogen lb.	Potassium lb.
1a Control	—	—	—
2a Monocalcium phosphate ..	30*	—	—
3a Di-ammonium phosphate ..	30	12	—
4a Di-potassium phosphate ..	30	—	33
5a Phosphoric acid plus urea ..	30	29	—
6a Glycerophosphoric acid ..	7	—	8

* This application is equivalent to 1⅓cwt. of superphosphate.

In the second series of plots (1b to 6b) equivalent amounts of nutrients as fertilisers, superphosphate, sulphate of ammonia, and muriate of potash were applied as a normal topdressing. The above phosphate solutions were applied in two applications, the first of 10lb. of phosphoric acid equivalent and the second of 20lb. of phosphoric acid per acre. Glycerophosphoric acid, the phosphatic content of which is very low (3.6 per cent. of phosphoric acid), was applied in two equal applications. No burning of foliage was observed after the first application. The second application of phosphoric acid plus urea resulted in slight burning of grasses and clovers and distortion of weeds, and glycerophosphoric acid caused slight spotting of the clovers. However, after a few days the burning effect disappeared and the herbage recovered. The other phosphate solutions did not cause any burning of the foliage.

PASTURE PRODUCTION

Responses have been measured by mowing and weighing the herbage. The total herbage production of dry matter of the various treatments for the first 9 months of the trial is given in Table 2. The yields are given in percentages relative to control (no fertiliser), which is assessed at 100.

TABLE 2—HERBAGE DRY MATTER YIELDS (9 MONTHS) IN RELATION TO YIELD OF NO-TREATMENT PLOTS

Treatments	Yields from spray-applied fertilisers relative to control (100) (a)	Yields from normally topdressed fertilisers relative to control (100) (b)
1	100	100
2	113	117
3	120	114
4	118	119
5	105	114
6	108	108

All inorganic phosphate solutions except phosphoric acid plus urea showed a quicker response during spring than applications made by normal topdressing. Phosphoric acid plus urea has given a very disappointing result. The organic glycerophosphoric acid appears to be slower acting, but its effect is more lasting. Owing to the low concentration at which this material must be used it is impracticable to apply adequate quantities of phosphate because of run-off.

This trial has shown:—

1. That pasture plants are capable of absorbing various forms of phosphate through their leaves; and
2. That there is no evidence to support the contention that phosphate applied as spray directly on to leaves of pasture plants is more effective than the equivalent amount of phosphate applied as a topdressing.

—*J. KARLOVSKY*

* * * *

RESPONSES OF GRASSES AND CLOVERS TO PHOSPHATES AND LIME

A SERIES of trials has been in progress at the Marton Experimental Area for the past 5 years in which a number of phosphatic fertilisers have been compared with and without lime on both a normal mixed pasture sward and an area of as pure white clover as could be obtained. At first this white clover sward was obtained by planting out tillers multiplied from a single original plant, but during the last 2 years row sowings of pedigree white clover seed were found to give less trouble in maintaining a pure clover sward. The trials were laid down primarily to determine whether white clover was more sensitive to phosphatic and lime topdressing than a mixed sward; if this was the case, it would give greater responses and make easier the comparison of the different materials. The difference in sensitivity between a pure white clover sward and a normal mixed pasture was, in general, surprisingly small. For most purposes there seems to be little or no benefit to be gained in maintaining the clover sward, which is very difficult to keep clean and has a useful life for trial purposes of not more than 2 years. However, the trials did show in one year that the lime applications actually depressed clover growth whereas the mixed sward showed a response. This effect was confirmed by the fact that the clover in the mixed sward was also depressed, although the response of grass growth to lime more than made up for this depression. This result clearly shows that the various species in a pasture may show a different reaction to lime just as they may do to fertilisers, weedkillers, and general pasture management.

COMPARISON OF PHOSPHATES

The phosphates compared in these trials were superphosphate, serpentine superphosphate, lime-reverted superphosphate, and a 50-50 mix of superphosphate and lime. This mix was made 2 to 3 weeks before application to allow thorough reversion of the superphosphate. All these materials were applied to give the same phosphate application as was contained in 4cwt. per acre of superphosphate. Differences in response among these materials were small. Results from this trial are being followed up by a number of experiments in which the superphosphate-lime mixture is included.

—*P. B. LYNCH*

Break Grazing in Auckland Province with Electric Fence

By J. E. BELL, Fields Superintendent,
Department of Agriculture, Auckland

BEFORE the introduction of the electric fence little was attempted in the way of break grazing of crops or grass for feeding cattle in Auckland Province. Even pastures saved in autumn for feeding in winter to early calving cows were not break grazed, and much of this valuable fodder was consequently spoilt. Even though the on-and-off system of grazing was employed, approximately half this grass would be eaten and half trampled into the wet ground. One of the first uses of the electric fence was for the utilisation of saved autumn growth. So successful was this that farmers closed larger areas even to the extent of enabling them to keep newly calved cows supplied with a substantial daily ration of leafy grass until spring growth commenced. This system of grazing has become increasingly popular, and the electric fence is now standard equipment for the dairy farmer for this purpose alone.

FARMERS noted that the electric fence permitted good utilisation of grass 6in. to 12in. long and realised that grass production increases with longer spells between grazing, so they extended the system for winter grazing into spring. This, it was quickly noted, resulted not in any immediate increase in milk production, but an increase in the surplus growth which must be converted into hay or silage. It was considered that the increased supplies of hay and silage could result in increased stock numbers in the following season and that some increase in production would then follow with the continuation of the new grazing policy.

Above—The ryegrass content of a sward may be increased by the cattle being concentrated on it while they are dry and fed with hay and silage. The resultant trampling, hard grazing, and seeding of the hay will change the composition of the field. Below—Use of the electric fence permits good utilisation of grass 6in. to 12in. long and will result in an increase in grass production because of the longer spells which can be allowed between grazings.

Most farmers stopped using the electric fence at the start of the busy period of silage and hay harvesting, and therefore long spelling usually ceased then. However, a few enthusiastic farmers, noting the increased grass growth, have continued the system over summer and even to the end of the lactation. They have encountered difficulties, because during the harvesting period the grass is becoming stemmy and even with the electric fence good utilisation is not possible without either using the mower or putting the cows on a restricted diet and obtaining less milk. Consequently the length of spells between grazings must be lessened in any case. Those who kept the long spelling going, however, found that there was a resultant carry-over of a considerable amount of the abundant spring feed into summer, which might be an advantage if dry weather caused a decline in pasture growth. This advantage is a doubtful one because of the tendency of the saved spring feed to become stemmy and bolt to seed. More feed was certainly available, but it was of lower quality.

Effect on the Sward

Before the electric fence made its appearance fields closed in autumn for provision of winter grass tended to run to dominance by Yorkshire fog. With better utilisation of pasture by use of the electric fence the tendency of fields closed in autumn is to become more cocksfoot dominant than Yorkshire fog dominant. The clover content of the sward is generally fairly well maintained, but there is a loss of perennial ryegrass. Such a sward may still be highly productive, and if it is considered that an increase in the ryegrass content is desirable, the change can be made fairly rapidly by the practice known as wintering in the Waikato. This involves concentrating the cows while dry on the field in question and feeding them hay and silage.

With the trampling, hard grazing, and seeding of the hay the field soon changes its composition. Of course the more ryegrass seed there is in the hay the greater the immediate transformation will be. In other words, the more mature and, therefore, the worse the hay is as feed, the better the establishment of the ryegrass will be. This wintering is a good policy in any case, because it enables the remainder of the pasture on the farm to be spelled for feeding to the cows when they calve. Only one or two fields can be drastically wintered on each year, and consequently the long spelling system should not be extended so much into spring and summer that more than one or two fields require this treatment each year. So far on farms where the system of long spelling has been carried on throughout the season the pastures have not got out of hand.

Recommendations

The system of long spelling and use of the electric fence, therefore, has definitely proved its worth in autumn and winter.

In spring it increases growth when it is normally abundant and is not so valuable. When the grass becomes stemmy about November the system needs careful watching to see that the feeding quality of the pasture does not suffer unduly. The tendency should then be to lessen the length of spells between grazings to keep the grazing leafy, to continue the use of the electric fence, and to feed the break when the pasture is 4in. to 6in. high.

The ryegrass content of the sward should be watched carefully and consideration given to the introduction of short-rotation ryegrass, since this grass appears to thrive better than perennial ryegrass under lax grazing and appears to be more palatable in the stemmy stage.

Bulletins for the Dairy Farmer

Free Bulletins

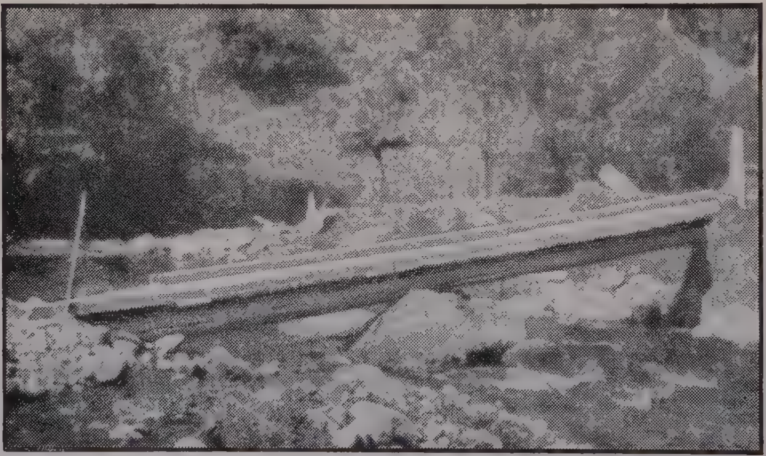
Nos.	
15	Causes of Excessive Waste in the Pig Industry.
51	Testing Milk and Cream for Content of Fat.
154	The Layout and Construction of Milking Sheds.
189	Control of Internal Parasites by Phenothiazine.
226	Weed Seedlings Controlled by Burner.
230	Castration of Pigs.
243	N.Z. Baconer and Porker Carcass Judging Standards.
248	Liver-fluke of Sheep and Cattle.
256	Liquid Manure.
260	Handbook of Mechanical Milking.
271	Farm Shelter.
302	Rejection of Pigs by Works.
312	Penicillin for Treatment of Mastitis.
315	The Mixing of Fertilisers for Single-dressing Applications.
323	Stock Losses from Transit Tetany.
328	Foot Troubles in Farm Animals.
329	Chemical Methods of Weed Control.
334	Piggery Layout.
343	Crops for Wintering Pigs.
344	Farm Water Supplies.
345	Concrete.
346	Homestead Shelter Planting.
347	Farm Dairy Instruction.
360	Feed Taints in Cream.
364	The Feeding and Management of the Sow and Litter.

Chargeable Bulletins

Milk Commission Report.	2s. 6d.
Annual List of Creameries, etc., 1950.	8s. 6d.
List of Registered Veterinary Surgeons.	1s.

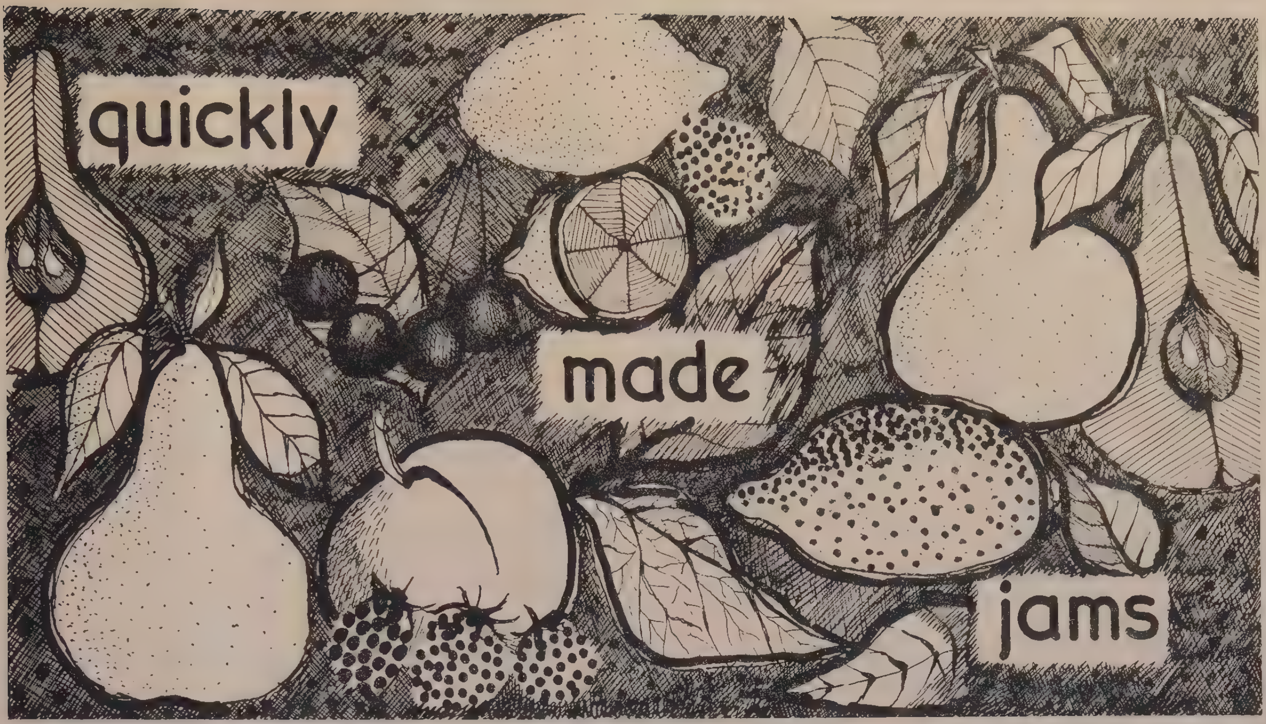
The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

Sheep Crossing for Floodable Stream



A USEFUL method of making a sheep crossing over a floodable stream on Mr. H. Brown's property at Raetihi is illustrated above. It consists of a straight-barrelled tree hauled across the stream and firmly anchored on the higher bank so that when the stream floods the tree instead of being washed away swings round parallel to the flow. After the flood the log is pulled back into position with a tracklaying tractor. The decking is preconstructed in 8ft. lengths 2ft. 6in. wide and is nailed on after the top of the log has been levelled. Sufficient stability is obtained with 3 or 4 nails in each 8ft. section, because when the sheep are crossing they stay well to the centre. The decking is removed each winter before floods are expected.

—*A. A. DUNCAN, Instructor in Agriculture, Department of Agriculture, Wanganui*



quickly made jams

NO longer need the unexpected discovery of an empty jam cupboard cause dismay. When an emergency arises jam of good colour and flavour may be made very quickly by the addition of pectin to the usual ingredients. Pectin also helps to solve the problems of jams that will not set and those that need long cooking, in hot weather a special source of irritation to the busy housewife. In this article Betty Johnston, Field Officer in Rural Sociology, Department of Agriculture, Wellington, gives a recipe for making pectin and other recipes for delicious jams and jellies which include this useful ingredient.

PROLONGED cooking, often required before jams or jellies will set properly, always destroys some of the fresh, natural colour and flavour of the fruit, and the longer the boiling time is the smaller is the final yield of jam or jelly. Pectin, the natural jellying substance in fresh fruits, may be obtained from a grocer either in powder or liquid form or it may be home-made as described in the recipe for pectin extract. When it is added to jam ingredients the cooking time is considerably shortened. The fruit is first cooked to a soft pulp and the sugar added; pectin is then stirred into the mixture. A few minutes only of rapid boiling, according to the times specified in the recipes, are required before the jam sets, and there is very little reduction in bulk owing to evaporation of water.

Disadvantages of Overcooking

Overcooking not only produces an undesirable colour and changes the flavour, but the valuable natural pectin may be partly destroyed and a jelly will not form. If the jam does jell, it is likely to be sticky and gluey, and the sugar may later crystallise out in lumps. Sugar crystallisation is not only due to overcooking, but may result from a too high proportion of sugar to fruit in the recipe. An unduly large amount of sugar may sometimes be the reason why jams and jellies fail to set. A poor juice may also be a possible reason for a jelly not forming, the proportions of acid and pectin in the fruit being incorrect. Cherries, pineapples, strawberries, and ripe apricots are rich in acid, but have a low pectin content; peaches, pears, elderberries, and all over-ripe fruits are deficient in both acid and pectin. Pectin may be added to the fruits in the first group and both pectin and an acid such as lemon juice (¾ fl. oz. per pound of raw fruit) or citric or tartaric acid (½ teaspoon per pound of raw fruit) to the fruits in the second. To test for the pectin content of fruit mix 1 tablespoon of juice with 1 tablespoon of methylated spirit. A solid jelly forms if the juice is rich in pectin; when the pectin content is low small lumps only of jelly will form. To decide the amount of pectin extract required add ¼ teaspoon at a time to the juice, stirring after each addition until a thick clot results. The amount of pectin to be added to each cup of juice may be calculated from the result of this test. For example, if ½ teaspoon of pectin extract is required to form a clot with 1 tablespoon of juice, the proportion is 1 : 6, and 1 cup of pectin extract is required for every 6 cups of juice.

Care should be taken not to add an excess of pectin, as this will result in a cloudy jelly.

Elderberries, peaches, pears, and over-ripe fruit are not suitable for jelly making, but satisfactory jams may be made from them by adding both acid and pectin.

New Zealand has a wide variety of fruits suitable for making into jams and jellies, but unfortunately many of them ripen at a time that coincides with hot weather, haymaking, and the end of the school holidays. Many a country mother, busy with extra meals for harvesters and a large, hungry family, finds as the temperature soars that toiling over a witch's cauldron of steaming jam is a wearisome and irritating task. Obviously, to preserve a good colour and flavour in the jam and to spare the cook's temper, the preparation and cooking times should be kept to a minimum.

Preparation and Cooking of Fruit

For jams and jellies use only sound, well-ripened fruits. Small spots may be cut out, but no bad or over-ripe flesh should be left. Wash the fruit only if it is necessary and wipe it quickly with a clean cloth. Remove large stones and cut the fruit into pieces. Weigh the fruit and the sugar.

Place the fruit in a saucepan and add sufficient water to prevent it from sticking to the bottom.

Extra acid is added to some sweet fruits such as pears and peaches before cooking. Cook the fruit rapidly until it is soft and well broken and then add the sugar. If there is any doubt about the pectin content, the fruit juice should be tested before the sugar is added, and the amount of extra pectin required calculated. When the fruit and sugar mixture is boiling rapidly add the pectin and boil the mixture again for 1 minute or until the jam thickens when a little is dropped on a cold plate. Do not cook the

Guaranteed

DOUBLE-STRENGTH VITAMIN CONTENT

standardized by continuous laboratory control

When you feed your flocks additional vitamins, how *certain* are you that they are getting an adequate supply? With Poultrol there's no uncertainty, because the manufacturers *guarantee* the vitamin content of Poultrol. Every pound is guaranteed to contain one million units of Vitamin A and 100,000 units of Vitamin D3. Only continuous laboratory control ensures this standardized vitamin content. That's why Poultrol is still the *surest* guardian of your birds' health.

POULTROL
DOUBLE STRENGTH

OIL OR EMULSION

Sketches from the Academy Catalogue

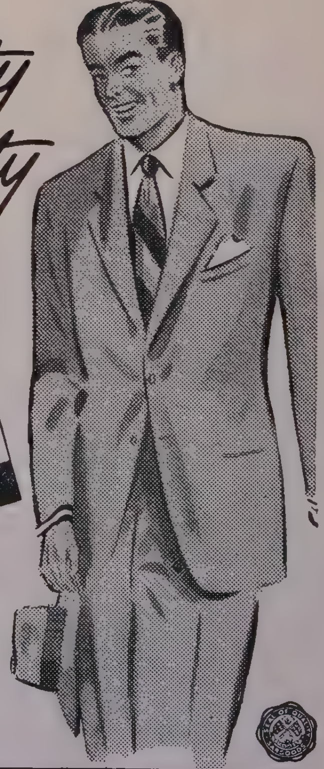
3568
3554
Academy
PATTERNS
A.S.

Created for YOU! . . . designed to fit the New Zealand figure-type . . . and so easy to make! Academy Patterns leave nothing to chance — they're accurate to the smallest detail. From leading stores everywhere.

styled to please-fashioned to fit

---

they LOOK quality
-they ARE quality



LOOK FOR THIS LABEL

I Invincible
SUITS FOR MEN

AND BE REASSURED

I 8-1

DISTRIBUTED THROUGHOUT N.Z.
BY SARGOOD SON & EWEN LTD

jam longer than 3 minutes after adding the pectin. Pour it into hot, clean jars and cover it with paper, transparent cellulose, or paraffin wax.

Use of Frozen Fruit

It is possible to eliminate cooking altogether by making small quantities of frozen fruits such as raspberries, strawberries, loganberries, and boysenberries into jam. The fruit is thawed quickly, then crushed into pulp; sugar is added and stirred into the mixture until it has dissolved. Next, pectin is stirred into the jam. After 5 minutes of stirring the jam is bottled in clean, sterilised jars and stored in a cold place or in a refrigerator. In this way jam with a very fresh flavour and colour may be obtained, but it will not keep for much longer than 6 weeks, so this method is not for use with a large crop of fruit. Rather is it for sudden emergency, when stores have disappeared during winter and jam is needed for immediate use.

Dried apricots are a very useful standby for winter jam making, as is frozen fruit. The use of the latter may seem extravagant, but the cost of small quantities is not excessive, especially when weighed against the advantages of excellent flavour and colour, and because only sound, whole fruit is used there is no waste. These jams may be used for special occasions or to provide variety.

Recipes

In the recipes given it will be noticed that the proportion of sugar seems to be rather high. When pectin is used cooking time is shortened and some of the fruit juice that would have been boiled away is saved, and the final yield of jam or jelly is greater than when pectin is not added. The extra sugar helps to convert the extra juice into jam. The over-all advantages of using pectin are that fruits which normally will not jell are made into satisfactory jams or jellies, time and fuel are saved, and if bought pectin is used, the added cost is partly offset by the extra jam or jelly yielded.

Liquid pectin will not keep after the seals on the bottles have been broken, so it is advisable to put home-made pectin extract in small jars, or, when small quantities are required, to use powdered pectin.

Home-made Pectin

If home-made pectin is used in any of the recipes given here, the amount required is calculated after the cooked fruit juice has been tested.

Covering of Jars

Unless otherwise stated all the jams when bottled are covered with paper, transparent cellulose, or paraffin wax.

Pectin Extract

½lb. of white skin from any citrus fruit
3 tablespoons of lemon juice
6 cups of water

Remove the yellow rind from the fruit by grating or peeling it very thinly. Take off the white skin and mince it, add the water and lemon juice, and leave the mixture overnight. Bring the minced peel, water, and lemon juice to the boil, and again let the mixture stand overnight. Next morning boil it for 15 to 20 minutes; then strain it. If there are more than 2 cups of liquid, boil the extract rapidly until it is reduced to that amount. Bottle the extract while it is boiling hot in small, sterilised jars, which should be sealed immediately. Shake the jar before using the pectin and do not attempt to keep the extract after the jar has been unsealed.

Jam Recipes

Cherry Jam

2 envelopes of powdered pectin and 4 fl. oz. of water or 1 bottle of bought pectin
3½lb. of firm, ripe cherries
4lb. of sugar

Wipe and stone the fruit. Place it in a saucepan with a small quantity of water and simmer it gently for 5 minutes. Bring the fruit to the boil and gradually add the sugar. When all the sugar has dissolved boil the mixture for 5 minutes, stir in the pectin, and bring the jam to a rapid boil. Boil it for 1 minute or until a little of it begins to thicken when dropped on a cold plate. Skim off the froth and pour the jam into hot, clean jars. Cover the jars. This recipe gives about 8lb. of jam.

Strawberry Jam

3lb. of firm, ripe strawberries
⅓ pint of water
4½lb. of sugar
½ teaspoon of butter
2 envelopes of pectin and 4 fl. oz. of water or 1 bottle of bought pectin

Pectin is stirred into the boiling jam.

Weigh the fruit after it has been cleaned. Weigh the sugar. Heat the strawberries and water in a saucepan and allow them to boil rapidly for 2 minutes. Gradually add the sugar and a small lump of butter to prevent frothing. When all the sugar has dissolved boil the mixture for 5 minutes, stir in the pectin, and bring the jam to a rapid boil. Boil it for 1 minute or until a little of it begins to thicken when dropped on a cold plate. Leave it standing in the pan for 5 minutes, skim it, and pour it into hot, clean jars. Cover the jars. This recipe gives about 7½lb. of jam.

Blackberry Jam

For this recipe use 3lb. of firm, ripe blackberries and then the ingredients and method as for strawberry jam, omitting the strawberries.

Peach Jam

4lb. of firm, ripe peaches
3¼lb. of sugar
3oz. of lemon juice
1 or 2 young peach leaves
2 envelopes of pectin and 4 fl. oz. of water or 1 bottle of bought pectin
½ teaspoon of butter

Weigh the fruit after removing the stones. Weigh the sugar. Heat the crushed peaches, peach leaves, and lemon juice in a saucepan until the fruit is tender. Bring the fruit pulp to the boil and gradually add the sugar and butter. When these have dissolved boil the jam rapidly for 5 minutes. Stir in the pectin and boil the jam briskly for 1 minute or until a little of it begins to set when dropped on to a cold plate. Skim off the froth. Bottle the jam in hot, clean jars and cover the jars immediately.

Ripe Apricot Jam

4lb. of ripe apricots (use only good-quality fruit)
5lb. of sugar
1 tablespoon of chopped apricot kernels
1 teaspoon of butter
Sufficient water to prevent the fruit from sticking to the bottom of the pan
2 envelopes of powdered pectin and 4 fl. oz. of water or 1 bottle of bought pectin

Stone, but do not peel, the apricots, cut them into small pieces, and thoroughly crush the fruit. Weigh the sugar. Cook the apricots and kernels rapidly together until the fruit is soft. Add the butter and sugar to the contents of the pan and boil the mixture for 1 minute. Stir in the pectin and boil the jam for another minute. Remove the pan from the flame and allow the jam to stand for 5 minutes. Skim off the froth and bottle the jam in hot, clean, jars, covering them immediately.

Ripe Pear Jam

3lb. of pears (use only good-quality fruit)
3 teaspoons of mixed spice, or ¼lb. of crystallised, preserved ginger
3¼lb. of sugar
2¼oz. of lemon juice
2 envelopes of powdered pectin and 2 fl. oz. of water or 1 bottle of bought pectin

Bought 17½ Years Ago,

READ THIS LETTER* — IT *PROVES* SPEEDEE QUALITY

32 Drake Street, Vogeltown,
NEW PLYMOUTH.

Messrs. H. C. Urlwin Ltd.
CHRISTCHURCH.

Dear Sirs,

My wife and I have discovered that it is over 17 years since we purchased a Speedee Toaster from Messrs. Farmers Co-op. Ltd., Hawera. It has been in daily use ever since its purchase and it has travelled to England and back. We estimate it has covered 35,000 miles. This may not seem very extraordinary, but it still has the original element in it, and although a little battered, it still toasts our "Daily Bread."

Wishing your firm every success for the future with the hope that other firms emulate your example in making articles that truly last.

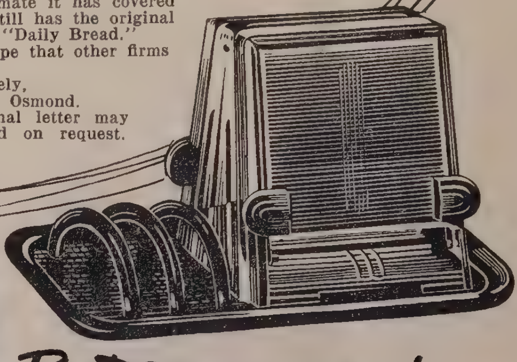
Yours sincerely,
J. Osmond.

* Original letter may be read on request.

Speedee Toasters

The Best Toaster Value!

Made by: H. C. URLWIN LTD., Waltham, CHRISTCHURCH.

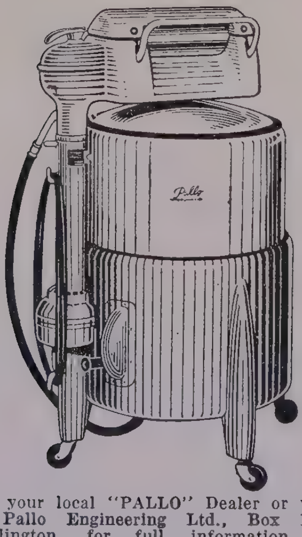


Wash clothes snow white with a

PALLO

DE LUXE

NEW ZEALAND'S FINEST WASHING MACHINE



See your local "PALLO" Dealer or write to Pallo Engineering Ltd., Box 1304, Wellington, for full information and literature.

I'm so happy with my G.E.C.

It's wonderful to have a refrigerator with *all* the room you want in it! No more worry about keeping your food fresh. Firm butter, crisp salads and iced drinks at any time. Ices for parties. Dishes prepared and stored ready to pop into the oven. When you've had a G. E. C. Refrigerator for a few weeks you'll wonder how you ever lived without it.

✦ **The Pride of your Kitchen.** ✦

A beautiful cabinet of gleaming white enamel, cleaned inside and out with the whisk of a damp cloth. It takes up the minimum of floor space. The thermostatically controlled motor is practically silent. When you open the door, the whole interior lights up.

5 Years' Guarantee goes with the sealed refrigerating system. The whole refrigerator is guaranteed for one year.

BRITISH GENERAL ELECTRIC CO. LTD.
Wellington · Auckland · Christchurch · Dunedin

R·3·9

NOT THIS . . .
. . . BUT THIS

The use of pectin in some jams will save considerable time and effort.

Peel, core, and crush the pears, and place them with the spice or ginger in a pan. Bring the fruit to a rapid boil and add the sugar and a small lump of butter to prevent frothing. Boil the jam hard for 1 minute, stir in the pectin, and boil the jam rapidly for another minute. Remove the pan from the flame and allow the jam to stand for 5 minutes. Skim the jam and bottle it in clean, hot jars, covering it immediately.

Raspberry or Loganberry Jam

2½lb. of fresh berries
3lb. of sugar
1oz. of lemon juice
1 envelope of powdered pectin and 2 fl. oz. of water or ½ bottle of bought pectin

Pick over the berries carefully but do not wash them. Crush the berries, add the lemon juice, and heat the mixture to simmering point. Gradually add the sugar and boil the jam vigorously for 1 minute. Stir in the pectin. Boil the jam rapidly for 3 minutes, skim it, and pour it into hot, clean jars. Cover the jars immediately.

Non-boiled Raspberry Jam

An alternative method for making raspberry jam, using either fresh or frozen fruit in the proportions given in the preceding recipe, is to put the raspberries in a pan on the stove. Sugar is placed in another pan or flat tin in the oven. Both are heated until they are too hot for a finger to be held in them. The two are mixed together and pectin is stirred into the mixture, which should be stirred for 5 minutes. The covered pan is allowed to stand aside for 15 minutes and then the mixture is again stirred for 5 minutes. It is bottled in warm, clean, dry jars and covered immediately.

When frozen raspberries or other frozen berries are used allow 10oz. of sugar, 1oz. of lemon juice, 2oz. of water, and ⅓ of an envelope of powdered pectin (or its equivalent in liquid pectin) for each package of fruit.

Uncooked Raspberry Jam

Three 12oz. packages of frozen raspberries or 2lb. of fresh, clean raspberries
2½lb. of sugar
6oz. of water
1oz. of powdered pectin

Thaw the berries and crush them. Mix the sugar with the berry pulp and allow the mixture to stand for about 20 minutes, stirring occasionally. Stir the pectin into the boiling water and allow this mixture to boil rapidly for 1 minute. Remove it from the heat and stir it into the berries and sugar. Stir the jam for about 2 minutes. Pour it into clean, sterilised jars. Cover the jars. This jam will keep for about 6 weeks if it is stored in a cool, dry place or in a refrigerator.

Jelly Recipes

Elderberry Jelly

4lb. of elderberries
3¼lb. of sugar
3oz. of lemon juice
2 envelopes of powdered pectin and 4 fl. oz. of water or 1 bottle of bought pectin

Remove the large stems from the berries and discard all marked or over-ripe berries. Place the fruit in a preserving pan and crush it. Simmer the berries for 15 minutes, then strain the pulp in a jelly bag, but do not squeeze the bag. Heat 1½lb. of the juice and sugar in a pan, then add the lemon juice. Bring the juice to a rapid boil and add the pectin. Boil the syrup again for ½ minute, remove the pan from the heat, skim off the froth, and bottle the jelly in clean, hot jelly jars. Cover each jar immediately with a thin film of paraffin wax.

Cherry Jelly

3½ cups of cherry juice (3lb. of cherries, 4 fl. oz. of water)
A few drops of almond extract or a few crushed cherry kernels
2¼lb. of sugar
2 envelopes of pectin extract and 4 fl. oz. of water or 1 bottle of bought pectin

Stone the cherries and simmer them with the water for 10 minutes in a saucepan. Strain off the juice in a jelly bag, but do not squeeze the bag. Mix the juice and sugar, bring them to the boil, and boil the syrup for 1 minute. Stir the syrup while it is boiling to prevent frothing. Remove the pan from the heat, skim off the froth, and pour the jelly quickly into hot, clean jelly jars. Cover the jelly at once with a thin film of paraffin wax.

Blackberry Jelly

2½ to 3lb. of blackberries (to yield about 3½ cups of juice)
2⅓lb. of sugar
2 envelopes of powdered pectin and 4 fl. oz. of water or 1 bottle of bought pectin

Crush the berries and simmer them with a little water (4 fl. oz.) for 10 minutes. Strain off the juice in a jelly bag, but do not squeeze the bag. Heat 3½ cups of juice with the sugar and when the mixture is boiling add the pectin. Stir the syrup to prevent frothing while it boils hard for 1 minute. Remove the pan from the heat, skim off the froth, and bottle the jelly in hot, clean jelly jars. Cover with a light film of paraffin wax.

Designed Flower Arrangement

To outline briefly the fundamental principles underlying designed flower arrangement, an art which New Zealand women are enthusiastically and ably taking up, is the object of a series of articles by Margaret O'Brien, Horticultural Department, Massey Agricultural College, Palmerston North, the first of which describes the most suitable flowers and correct methods of picking them.

OCCASIONALLY one hears the comment that the technical principles applied to flower arrangement are superfluous, for all flowers are pretty; therefore why not pick them on any convenient length of stem and simply put them in a vase which will provide the necessary support and water. True, all flowers are pretty, but to their natural beauty can be added design, enhancing that beauty and displaying it to the greatest advantage. Lack of balance, "spotty" colour schemes, and discords in texture are all elements which introduce a jarring note and detract from the restful atmosphere and rhythmic lines which belong to well-designed arrangements.

Medium of Self-expression

To a person with a working knowledge of the principles of design, flower arrangement becomes a medium of self-expression. Many know the pleasure of an original, wholly satisfying flower picture which is entirely the fruit of their own imagination and creative ability. For beginners to pause in the midst of their own efforts and to copy a good "piece" is an excellent check-up on their progress, but to make a habit of doing this robs the flower arranger of the satisfaction of original individual expression.

Given the same flowers and thereafter left to their own devices, no two people handle them identically. Apart from individual expression, another reason for this is that all perfect flower pictures are made up of three factors—the plant material, the container, and the background or surroundings. In most cases the surroundings are the home, the atmosphere of which is already the expression of its owner's tastes and where designed flower arrangements become a distinctive complement to the already established scheme of interior decoration.

Inspiration from Growing Plant

The trend of flower arrangement is toward that which is natural and simple. Many an outstanding piece is inspired by the line of growth of the plant or plants from which material has been gathered and many an original colour scheme is suggested by the distinctive colour combinations which appear in stamens, tendrils, stems, and flower bases, or by the amazing way in which in flowers themselves one colour is superimposed on another.

The majority of plants are so arranged that buds and tips in paler colours are uppermost, and then next in height are half-open flowers in deeper tones, tints, and shades; finally open blooms of fully developed colour value contribute apparent weight to the lowest portions of the plant. A reproduction of this order results in well-proportioned balance of both plant material and colour design, so that much plant knowledge can be acquired while the flowers are being picked, which will be a real contribution to arrangement later.

Flower arrangement can be done by everyone and need be in no way an expensive hobby. There are no flat dwellers in New Zealand who live so far from a country roadside, hedgerow, or beach that collections of rustic material are beyond their reach. It is not the quality or quantity of flowers that is of first importance, but what can be done with the material available.

Herbaceous Border Material

A lovely garden is, of course, a great asset, and the combination of good horticulture and flower arrangement lends scope for much consideration. A herbaceous border planted to serve this dual purpose provides interest for the garden and also a wide range of plants with distinctive foliage whose leaves keep well in water.

For example *Echinops ritro*, *Bocconia cordata*, *Funkia undulata*, *Cynara cardunculus* (cardoon, which has very decorative flower heads, either green or dried, as well as elegant grey-green leaves suitable for old-world arrangements), *Centaurea candidissima*, *Eryngium amethystinum*, and even the despised aspidistra in a shady corner all have clear-cut line and character as compared to a fluffy camouflage of maidenhair fern piled up over flowers whose individual form is one of their greatest assets.

HEADING PHOTOGRAPH: Informal line arrangement with the accent on the accessory. The foliage will be most effective if it has a likely association with the accessory.

Besides foliage the border provides tall spikes so useful for height and decided outlines; astilles, spireas, verbascums, golden rod, foxgloves, pentstemons, and red-hot pokers. Though the last-named are such beautiful colours, they must be used with caution, as the nectar they freely shed stains polished wood.

Then there are seed pods of liliums, irises, and oriental poppies which the orthodox horticulturist removes immediately after flowering, but a stalk of which the enthusiast in flower arrangement surreptitiously leaves here and there for future use.

Value of Annuals

A selection of annuals chosen with thought as to the interior colour schemes they will eventually be called on to enhance will simplify picking and look just as gay in the garden as others which will bear no relation to the indoor setting.

It is fun to spend winter evenings, armed with an array of flower catalogues, in choosing seeds the flowers from which provide contrast or harmony for curtains, wallpapers, and furnishings. The list invariably becomes so long that the flowers would fill the neighbour's garden too, and though it usually has to be drastically reduced, it is a great help in relating outdoor decoration to the indoor scheme of furnishing.

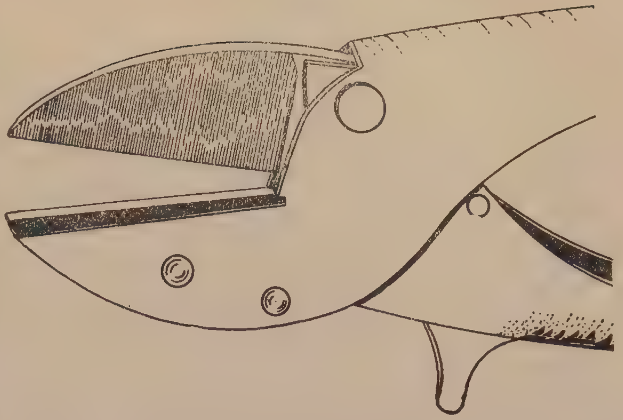
The great advantage of annuals is that they are cheap, provide a very wide range of colours, flower the better for being picked, and can easily be changed from year to year. Space does not permit details of approved horticultural practice, which is so important in the production of good cut flowers, but it is an aspect of flower arrangement which is of much interest.

The term "modern flower arrangement" is rather a misnomer, deterring some possessors of lovely old homes from pursuing the subject further. "Designed flower arrangement"—designed to suit individual settings—is more appropriate, and with this aspect in view it should be possible to develop a flower technique characteristic of, if not entirely exclusive to, New Zealand homes. A truly distinctive note in material, if not in design, could well be introduced by the use of more native material in suitable settings and for exhibition.

PICKING AND TREATMENT OF CUT FLOWERS

Flowers and plant material generally are best picked early in the morning before sun or wind has so affected them that the time they should normally remain fresh indoors is reduced. Picking in the rain is to be avoided if it is at all possible, for wet petals bruise much more easily than do dry ones; the result may not perhaps be unsightly brown bruises, such as one associates with damaged camellias, but bruises which later appear as withered, transparent, crumpled, or damaged petal edges shorten the life of an arrangement and detract from that fresh crispness which is one of the first essentials of attractive flower design. Bruised flowers are just as depressing as the ends of shoots which hang limply down, leaves which turn inside out, and material which has been damaged or is diseased.

Should it be unavoidable to pick in the rain, bruising can be partly avoided by shaking blooms individually as they are picked. The flower head must be supported with one finger, the stem held firmly, and the moisture removed with a swinging movement; to hold a stem end and flip it up and down will cause damage, for though the flower may not snap off, the petals will be bruised.



Roll-cut secateurs, with one sharp blade and one wide, flat blade, make clean cuts and do not crush the cells of the stems.

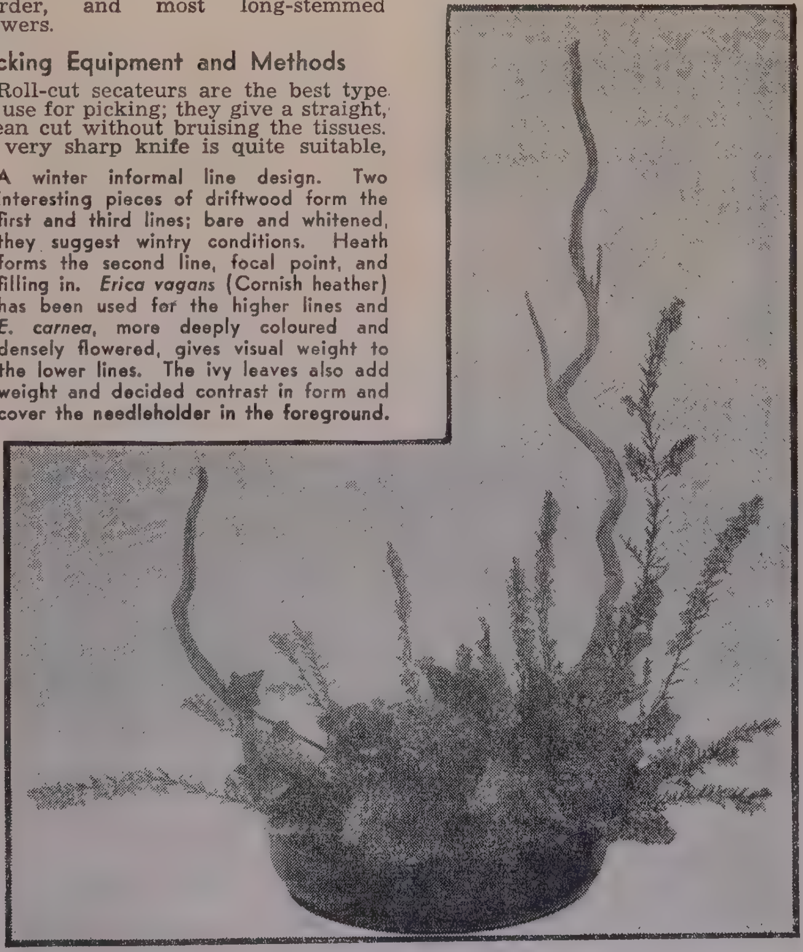
Picking Container Recommended

An upright container in which to place flowers as they are picked keeps them in much better condition than if bunches are left here and there in shady spots in the garden to be finally gathered up and taken inside in one glorious, weighty armful. An orthodox flower basket is suitable for short-stemmed odds and ends, but a bucket or a tin of appropriate height for the material being gathered is more satisfactory for chrysanthemums, gladioli, sprays from the herbaceous border, and most long-stemmed flowers.

Picking Equipment and Methods

Roll-cut secateurs are the best type to use for picking; they give a straight, clean cut without bruising the tissues. A very sharp knife is quite suitable, but not an old blunt pair of "flower scissors", that is, scissors which have seen better days but have been consigned to the kitchen drawer for flowers. Such scissors will crush the cells of a stem, leaving a rough, uneven surface with jagged strips of bark at the edges, all of which will hasten decomposition and reduce the intake of water.

The best spot at which to cut a stem so that the least damage is done to the plant is just above a bud or node; then



A winter informal line design. Two interesting pieces of driftwood form the first and third lines; bare and whitened, they suggest wintry conditions. Heath forms the second line, focal point, and filling in. *Erica vagans* (Cornish heather) has been used for the higher lines and *E. carnea*, more deeply coloured and densely flowered, gives visual weight to the lower lines. The ivy leaves also add weight and decided contrast in form and cover the needleholder in the foreground.

Travel Arrangements By Mail Order!

MITCHELL'S INTERNATIONAL TOURS—the Air Travel Consultants—have received so many requests from country people to arrange their travel, both overseas and within New Zealand, that they have now opened up a special "Mail Travel Division" to handle this business.

All details such as obtaining Passports, attending to Tax Clearances, Customs forms, and Medical formalities can be efficiently and quickly attended to by mail. Addressed envelopes always provided for your replies.

It costs You Nothing to Book Through MITCHELL'S, and it Costs You Nothing to BOOK BY MAIL!

Next Time You Travel Write to . . .

Mail Travel Division,

MITCHELL'S INTERNATIONAL TOURS

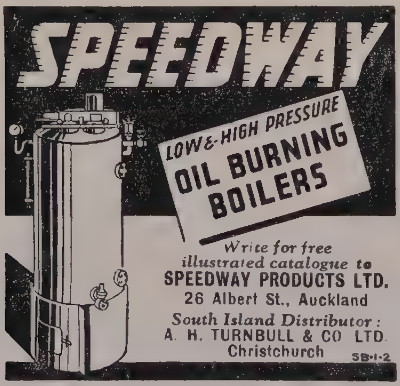
P.O. Box 412, Dunedin.

AGENTS FOR:—Tasman Empire Airways, B.O.A.C. and B.C.P.A., National Airways Corporation, and all leading world Air Lines.

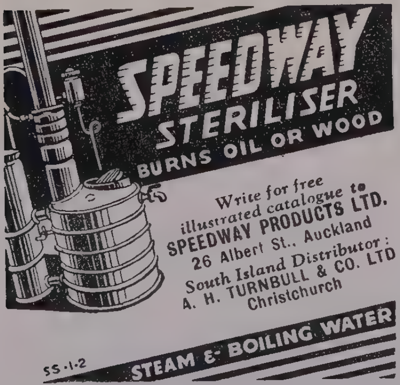
A Service to the Land

The many branches of the National Bank throughout New Zealand offer a service of experienced financial counsel to farmer customers.

THE NATIONAL BANK
OF NEW ZEALAND
LIMITED



Write for free illustrated catalogue to
SPEEDWAY PRODUCTS LTD.
26 Albert St., Auckland
South Island Distributor:
A. H. TURNBULL & CO. LTD.
Christchurch
SB-1-2



Write for free illustrated catalogue to
SPEEDWAY PRODUCTS LTD.
26 Albert St., Auckland
South Island Distributor:
A. H. TURNBULL & CO. LTD.
Christchurch
SS-1-2

Would you like a free copy of
"DAVIS DAINTY DISHES"?

Cut out this advertisement and send with your name and address and 3d. stamp for postage, to

DAVIS GELATINE N.Z. LIMITED,
Woolston :: Christchurch

SUMMER HOLIDAY SUGGESTIONS

Let Your Railways Help You

▽

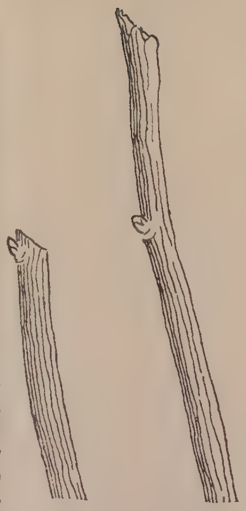
You, too, can enjoy a refreshing holiday this summer. It's not too late to arrange a welcome break in new surroundings . . . relaxation at the beach, a visit to the farm, or a trip to your favourite resort.

The Railways, with their fast, comfortable express train, railcar, and motor coach services offer a wide range of interesting journeys to very pleasant places.

Remember . . . the Railways provide you with comfortable service at reasonable cost—often the lowest cost.

▽

No Strain in the Train!



The stem at left is cut immediately above a bud, but not so close that the tissue of the bud will dry out. The stem at right is incorrectly cut midway between buds. A blunt knife was used to cut this stem, with the result that the edges are jagged and the bark is torn. The portion of the stem above the bud may be attacked by decay, which once it is established in the stem easily travels into the rest of the plant.

the remaining portion is not so likely to decay, as disease has not such a ready entrance. A stem cut midway between nodes is much more liable to infection. Incidentally, this method of cutting a stem as close to the node as possible without damaging the tissue of the node itself applies also to seasonal pruning and to the making of cuttings, except that in the latter case the basal cut is immediately below a node instead of above it.

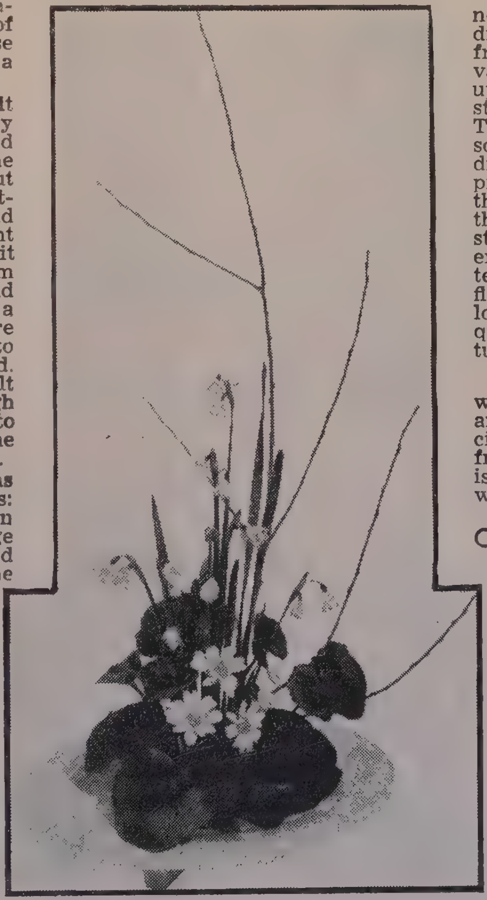
Once the stem is picked, the time it will keep in water is not affected by the position of further cuts required to fit it to the intended design. The chief aim in the handling of cut flowers is to keep the water-conducting tissues functioning properly, and this is another reason why an upright container for picking is helpful, as it prevents the cut ends of stems from drying out as quickly as they would if left lying in the garden even for a short time. Once the cut cells are dried and withered their capacity to take in water is considerably reduced. For material which is known to wilt easily it is a help to have just enough water in the picking container to keep the cut surfaces moist until the flowers are taken inside for soaking.

The degree of maturity of blooms for picking is governed by two factors: First, what is required for the design in mind, and second, the knowledge that the further a flower has developed the shorter its life becomes. For the average design, buds, half-open flowers, and a few fully opened flowers are required. As large, expanded blooms add visual weight and poise to a whole arrangement, most people prefer to sacrifice the length of time for which an arrangement will keep rather than detract from its balance by the use of immature flowers. In general the shorter a stem is the better the flowers and foliage on it will keep, but here again design will take precedence over keeping qualities. Leaves which will obviously come below the water line in a completed arrangement are best removed as the stems are picked, for they take up an undue amount of space in containers, are apt to splash water on flowers if they are cut off later, and if left on will eventually decompose, thereby polluting the water and reducing the life of an arrangement.

Soaking of Flowers

Soaking or "hardening" plant material is the next major consideration for good arrangement, for not only does this contribute to the keeping qualities, but it also plays a definite part in accurate designing. Flowers which have been thoroughly soaked are firm, easy to handle, and will remain in their allotted space in a design, whereas unsoaked flowers may appear on quite a different angle and plane in a few hours time, thereby upsetting carefully considered line and balance.

Here again the virtues of picking tins are obvious; it is a comparatively simple matter to carry them inside, fill them with water, and stand them aside in a suitable place to allow the flowers to soak for at least 4 hours. It is not such a simple matter, and by no means good for flowers, to carry them in as a bundle, put them down on a table, hunt for suitable containers, pull out stems one by one from the mass, and finally install them already rather bruised in a suitable place to "harden".



[*Perry*

Golden willow stems as the high line give the necessary height in an arrangement of short-stemmed snowdrops and aconite. The rounded aconite leaves add weight and stability to the base of the arrangement.

Four hours is the minimum soaking time for annuals, bulbs, and softer-stemmed herbaceous material, and at least 6 hours are required for the woody stems of chrysanthemums, shrubs, and the like. It is a fallacy that water can pass from cell to cell up the stem of a flower in a brief 20 minutes, yet this suggestion is sometimes brought forward.

The depth of water in which flowers soak obviously varies with the length of individual stems; roughly three-quarters of the stem should be immersed, but on no account must flower heads be allowed to sink into water. All the water that is taken up by a flower stem must pass through the cut end; none can enter directly through the sides. However, a suitably deep tin gives adequate mechanical support until the cells are filled with water and the stems are stiff and firm enough to support themselves. Some people avoid the wide, open, shallow containers so suitable for many modern line arrangements, fearing that material will not keep in so little water, but provided the required time for hardening has been allowed, keeping qualities will in no way be impaired.

A few extra degrees of heat are not nearly so damaging to flowers as a draught, which rapidly withdraws from the leaves in the form of water vapour the water which has travelled up the water-conducting tissues of the stem. Bright light hastens maturation. Therefore the best place in which to soak material is one free from draughts, with subdued lighting, and preferably cool, conditions which in the average home would be found in the washhouse. It is not advisable to store flowers in a household refrigerator; both the humidity and the temperature are too low, and although flowers will keep there and emerge looking crisp, afterward they will quickly collapse in ordinary temperatures.

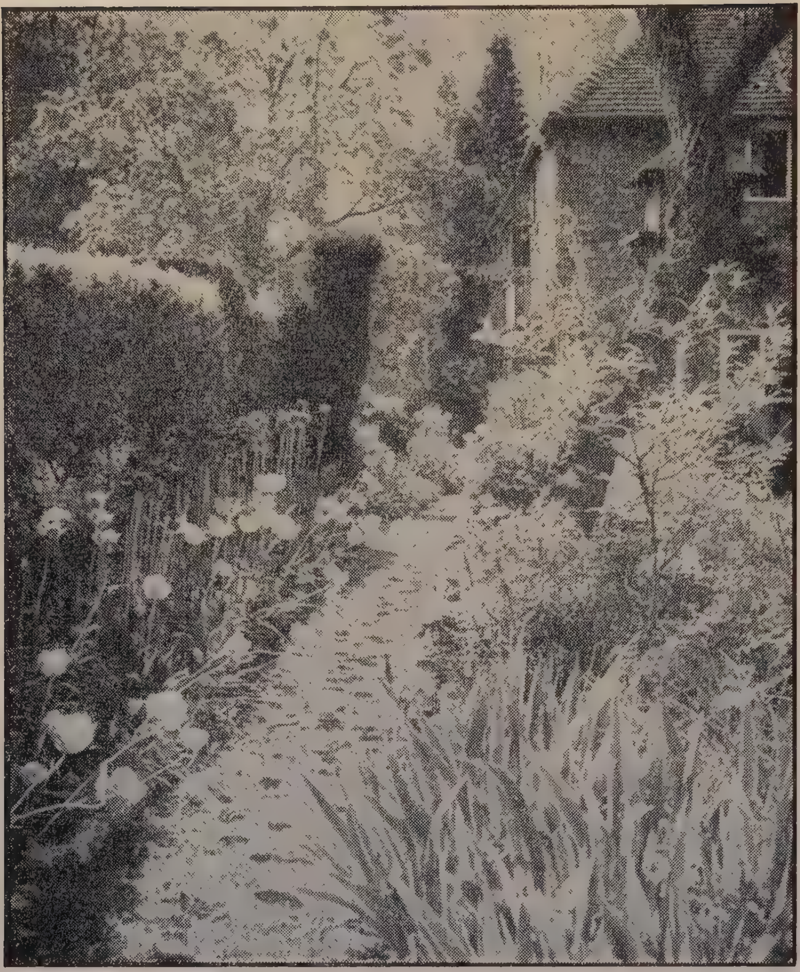
For soaking flowers ordinary tap water is the most suitable. Some artesian water is too cold and insufficiently aerated. For flowers picked from a heated glasshouse water that is just tepid must be used or they will wilt rapidly.

Chemicals in Water

The addition of various chemicals to flower water, to say nothing of an extraordinary collection of pennies, oil of cloves, hydrochloric acid, and even alcohol is based on the legends of our grandmothers rather than cold scientific fact, for they can in no way prolong the life of flowers. Aspirins are also favourites for this objective, and as one of the American flower books so aptly says, ". . . but do put one in, if it will make you feel better, for it can do the flowers no harm".

Changing of Water

It is quite unnecessary and hopelessly impracticable to change water daily. Provided the rules of flower hygiene are adhered to carefully, all that is required is the addition of sufficient fresh water to keep the



[*Douglas Elliott*

This garden serves the dual purpose of beautifying the surroundings of the house and supplying flowers which form an integral part of the interior colour scheme.

containers full. One sometimes hears the suggestion that stem ends should be recut each day. Anyone who has attempted to undo an arrangement and to reconstruct it with the same material well knows how disappointing, in fact how well-nigh impossible, this is. Flowers from a florist or flowers arriving by post will benefit from recutting of stem ends, as they are liable to dry out in transit.

Importance of Clean Containers

The chief concern in flower hygiene is the cleanliness of containers and holders. A certain variety of bacteria can remain in what appears to the unsuspecting as a harmless brown stain within a container. A detailed analysis of this "stain" usually reveals an accumulation of acid, wax, dust, and bacteria. Freshly cut stems exude small quantities of sap into the water which surrounds them, making a solution which attracts the quickly reviving bacteria; these settle down on the exposed surface of the cut stems and, reproducing themselves at a rate which only is possible to bacteria, effectively plug up the water-conducting tissue, thereby reducing the time the flowers would otherwise keep. This is the cause of more premature wilting than any other factor. Fortunately it is simply overcome by always using very hot soapy water and a good stiff brush to remove every trace of stain from holders, containers, and tins used for picking and soaking.

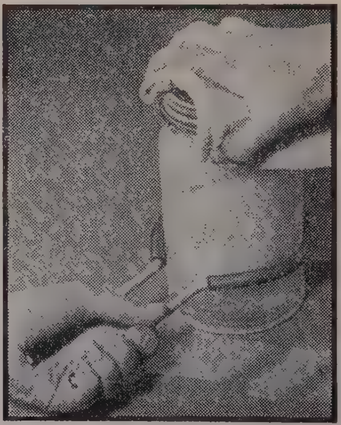
Exceptions to General Rules

There are a few exceptions to the general rules of flower-keeping methods. One is the treatment required for a stem which oozes a sticky sap which coagulates when exposed to the air and in the process effectively plugs up the water-conducting tissue. These stem ends need either burning or boiling, it matters not which, as the application of heat in any form prevents the sap from running out without damaging the cell tissues. However, only the cut surface requires this treatment; inches of burnt or boiled stem will decompose rapidly, polluting the water and causing premature wilting. Flowers which benefit from this heat treatment are all the poppy family, euphorbias (especially poinsettias), dahlias, campanulas, stephanotis, heliotrope, mignonette, and clematis.

Another exception to the general rule is that of a very woody stem which is commonly bruised or crushed to expose a greater surface of water-absorbing tissue. Though it certainly does increase the intake of water, this method has the desired effect up to a point only, for it is in direct contrast to a single clean cut, and greatly accelerates decomposition of the stem cells. It should be used as a last resort only. Pruning which aims at strong growth, balanced plant foods, and finally careful picking off of the current season's growth where possible are all factors which will reduce the need to hammer stems. This applies particularly to roses, which, if tended carefully, do not require heat or bruising, but benefit greatly by being put into water as they are picked from the bush.

Finally there are the really difficult subjects, such as hydrangeas and helleborus, which can never be guaranteed to keep well. As the coloured "petals" are not true petals, but only sepals, they can be put down flat in a few inches of water to soak without fear of damage. Picking the flowers when the so-called petals are matured and almost paper-like in texture is also helpful, but even then what appears to be very effective one season may be of no avail the next, probably owing to varying climatic conditions affecting the type of growth. Hot water for helleborus and bruising for hydrangea stems are suggestions that are often put forward; sometimes they succeed, but not always.

Useful Jar-holder



THE jar-holder shown in the illustration above may prove useful to the housewife who preserves by the pre-cooking method. It clamps tightly around the jar and holds it firmly and safely while the lid is being screwed down. Contact with the overflowing boiling syrup is thus easily avoided.

—*EVELYN E. MOORE,*
Field Officer in Rural Sociology, Department of Agriculture, Palmerston North

Child's Bright Fair Isle Jersey

FAIR ISLE jerseys generally have great appeal for children, and any 8-year-old girl would be proud to wear the attractive jersey illustrated here. In four colours, it is a warm and suitable garment for an active child, and can be made by following the instructions given in this article.

MATERIALS required are 3oz. of 3-ply wool in natural colour; 1oz. each of 3-ply wool in red, green, and brown; two No. 9 and two No. 12 knitting needles; four buttons.

Measurements: Length, 17in.; chest, 28in.; sleeve seam, 14½in.

Tension: 7 st. to 1in.

Abbreviations: K., knit; p., purl; st., stitch(es); inc., increase; dec., decrease; patt., pattern; rep., repeat; beg., beginning; cont., continue; n., natural; rd., red; gr., green; br., brown; tog., together; g.st., garter stitch.

The Front

Using No. 12 needles and n. wool, cast on 96 st. and work in k. 1, p. 1 rib for 2½in., inc. 1 st. at end of the last row (97 st.). Change to No. 9 needles, and work in patt. thus:—

1st row: K. 1 rd., * 2 rd., 1 br., 5 rd., 1 br., 3 rd. Rep. from * to end.

2nd row: P. 1 rd., * 1 rd., 3 br., 2 rd. Rep. from * to end.

3rd row: K. 1 rd., * 5 br., 1 rd. Rep. from * to end.

4th row: P. 1 n., * 5 gr., 1 n. Rep. from * to end.

5th row: K. 1 gr., * 1 n., 3 gr., 3 n., 3 gr., 1 n., 1 gr. Rep. from * to end.

6th row: P. 1 gr., * 1 gr., 1 n., 1 gr., 5 n., 1 gr., 1 n., 2 gr. Rep. from * to end.

7th row: K. 1 gr., * 2 gr., 1 n., 1 gr., 3 n., 1 gr., 1 n., 3 gr. Rep. from * to end.

8th row: P. 1 rd., * 1 rd., 3 n., 1 rd., 1 n., 1 rd., 3 n., 2 rd. Rep. from * to end.

9th row: K. 1 rd., * 5 n., 1 rd. Rep. from * to end

10th row: As 8th row.
11th row: As 7th row.
12th row: As 6th row.
13th row: As 5th row.
14th row: As 4th row.
15th row: As 3rd row.
16th row: As 2nd row.
17th row: As 1st row.
18th row: P. 1 n., * p. 1 gr., 1 n. Rep. from * to end.
19th row: K. 1 gr., * 1 n., 1 gr. Rep. from * to end.
20th row: As 18th row.
21st row: As 19th row.
22nd row: As 18th row.

These 22 rows form the patt. and are rep. until the work measures 11½in., finishing after a 14th patt. row.

Shaping the Armholes

1st row: Cast off 4 st. (1 st. left on right-hand needle from casting off), 1 br., 1 rd. Rep. from * of 3rd patt. row to end.

2nd row: Cast off 4 st. (1 st. left on right-hand needle from casting off), 2 rd. Rep. from * of 2nd patt. row to last 2 st., 1 rd., 1 br.

3rd row: K. 2 tog. rd., 3 rd., 1 br., 3 rd. Rep. from * of 1st patt. row until 8 st. remain, 2 rd., 1 br., 3 rd., 2 tog. rd. Break off rd. and br.

4th row: P. 2 tog. n., * 1 gr., 1 n. Rep. from * to last 2 st., p. 2 tog. n.

5th row: K. 2 tog. n., * k. 1 gr., 1 n. Rep. from * to last 2 st., k. 2 tog. n.

Cont. in the spot patt. over all stitches, dec. 1 st. each end of every row until 75 st. remain. Cont. without dec. until the work measures 15½in., finishing after a p. row.

Shaping the Neck

Next row: Patt. 31 st., cast off next 13 st., patt. to end. Cont. in patt. on last 31 st., dec. 1 st. at neck edge on every row until 24 st. remain. Cont. in patt. until the work measures 17in. from beg., finishing after a k. row.

Shaping the Shoulder

Cast off 8 st. at beg. of next 3 alternate rows. Rejoin wool at neck edge of other side and work this side to match.

The Back

Work the back exactly as for the front until 3rd row of armhole shaping has been completed.

4th row: P. 2 tog. n., * 1 gr., 1 n. Rep. from * 18 times, 1 gr., turn (leave other 46 st. for the present).

Next row: Cast on 4 st., k. these 4 st. in n., patt. until 2 st. remain, k. 2 tog.

Cont. on these stitches, dec. at armhole edge until 35 st. remain, and keeping 4 underwrap st. in g.st., then cont. straight until the work measures 17in., finishing at neck edge.

Shaping the Neck and Shoulders

Next row: Cast off 7 st., patt. to end.

Next row: Cast off 8 st., patt. until 2 st. remain, patt. 2 tog.

Next row: Patt. 2 tog., work to end.

Rep. last 2 rows once more. Cast off remaining stitches. Rejoin wool to other 46 st. at centre front, k. 4 st. in n., then (1 n., 1 gr.) to last 2 st., k. 2 tog. Work to match other side, keeping overwrap in g.st. and making a buttonhole on 4th row as follows:—

Next row (centre back): K. 1, cast off 2 st., patt. to end.

88—CHILD'S BRIGHT FAIR ISLE JERSEY . . .

In next row cast on 2 st. in place of those cast off. Making 3 more buttonholes at 1½in. intervals, cont. to match other side.

The Sleeves

Using No. 12 needles and n. wool, cast on 48 st. and work 3in. in k. 1, p. 1 rib, inc. 1 st. at end of last row (49 st.). Change to No. 9 needles and cont. in patt. as for the front, inc. 1 st. both ends of the 7th and every 6th row following until there are 77 st., keeping continuity of the patt., and working extra stitches into patt. Then cont. straight until the sleeve measures 14½in. from beg.

Shaping the Top

Dec. 1 st. at beg. of next 8 rows, then dec. 1 st. each end of every row until 21 st. remain. Cast off.

The Half Collar (Two Alike)

Using No. 9 needles and n. wool, cast on 53 st. and work in k. 1, p. 1 rib for ½in.

Next row: Rib 4, * rib 2 tog., rib 12. Rep. from * twice more, rib 2 tog., rib 5 (49 st.).

Join on rd. and br. wools. Now work as follows:—

1st row: K. 1 rd., * 5 br., 1 rd. Rep. from * to end.

2nd row: P. 1 rd., * 1 rd., 3 br., 2 rd. Rep. from * to end.

3rd row: K. 1 rd., * 2 rd., 1 br., 5 rd., 1 br., 3 rd. Rep. from * to end.

Break off coloured wools and cont. in n.

Next row: P. 1, * p. 2 tog., p. 3. Rep. from * to last 3 st., p. 2 tog., p. 1.

Change to No. 12 needles and work in k. 1, p. 1 rib until collar measures 1¾in. Cast off in the rib.

The Make-up

Sew the shoulders together, then sew in the sleeves. Press the work on the wrong side with a warm iron and damp cloth. Sew up the sleeve and side seams. Sew on the half collars. Sew the underwrap in position and sew on the buttons to correspond with the buttonholes. Press all the seams.

A Neat, Simply Made Jersey for a Young Lad

ANY young lad who owns the snugly fitting jersey illustrated here will like wearing it, especially as it has a rounded neckline to keep his tie in place. Four rows form the simple slip-stitch rib pattern, bordered with treble rib, and instructions for making the jersey are given in this article.

MATERIALS required are: 5oz. of 3-ply wool, 1 pair each of No. 9 and No. 12 knitting needles.

Measurements: Length from shoulder, 17in.; width all round under the arms, 28in.; sleeve seam, 15in.

Tension: 7 stitches and 9 rows to 1in.

Abbreviations: K., knit; p., purl; st., stitch(es); sl., slip; rep., repeat; beg., beginning; dec., decrease; inc., increase; tog., together; patt., pattern.

The Back

With No. 12 needles cast on 99 st. and work in rib.

First row: K. 3, * p. 3, k. 3; rep. from * to end. Second row: P. 3, * k. 3, p. 3; rep. from * to end. Rep. these 2 rows for 2¼in., ending with a second row. Change to No. 9 needles and the patt. as follows: First row: K. 3, but winding wool twice round right-hand needle for each st., * p. 3, k. 3, but winding wool twice round right-hand needle for each st.; rep. from * to end. Second row: Holding wool in front, sl. 3, letting the extra loop drop off needle, wool back, * k. 3, bring wool forward, sl. 3, letting extra loops drop; rep. from * to end, finishing sl. 2, p. 1. Third row: Holding wool at back of the work, sl. 3, bring wool forward, * p. 3, wool back, sl. 3, bring wool forward; rep. from * to end, finishing sl. 2, k. 1. Fourth row: As second row. These 4 rows form one patt. Continue in patt. until the work measures 11in. from beg.

Armhole shaping: Cast off 3 st. at beg. of next 4 rows, then dec. 1 st. at both ends of next 3 rows, after which dec. 1 st. at both ends of next 3 alternate rows. Continue without shaping until the work measures 16¾in. from beg.

Shoulder shaping: Cast off 8 st. at beg. of next 4 rows, then cast off 9 st. at beg. of next 2 rows. Leave remaining stitches on a spare needle for back neck.

The Front

Work as given for back until the work measures 13½in. from beg., ending with a wrong side row.

Neck shaping: Next row: Patt. 31, take 2 tog., turn, leaving remaining stitches on a spare needle. Continue on first set of stitches, but dec. 1 st. at the neck edge on next 3 rows, then on next 4 alternate rows. Continue without shaping until the work measures 17¼in. from beg., ending at armhole edge.

Shoulder shaping: Cast off 8 st. at beg. of next row and next alternate row. Work 1 more row, then cast off remainder. With right side of work facing the knitter slip the first 9 st. on to a spare needle, join wool to remaining stitches, and work up this side to match the first.

Bulletins for the Housekeeper

Nos. Free Bulletins

335 Cooking with Compressed Yeast.
350 Tomato Cookery.

Nos. Chargeable Bulletins

337 The Child and His Family. 6d.
338 Food and Health. 1s. 6d.

The above bulletins are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

The Sleeves

With No. 12 needles cast on 45 st. and work in rib as given for back waist for 2in. Change to No. 9 needles and work in patt., but inc. 1 st. at both ends of the fifth row and every following eighth row until there are 75 st. Continue without shaping until the work measures 15in. from beg., then shape top by dec. 1 st. at both ends of next 8 alternate rows, after which dec. 1 st. at both ends of every row until 21 st. remain. Cast off.

The Neck Band

Join the right shoulder seam, then with the right side of the work facing the knitter and using No. 12 needles pick up and k. 25 st. down the side of the neck edge, k. the 9 st. from spare needle, pick up and k. 25 st. along the other side of the neck edge, then k. the 25 st. from back neck. Work 1in. in k. 3, p. 3 rib. Cast off loosely ribwise.

Making up

Press the work lightly. Join the left shoulder seam, sew in the sleeves, then sew up the side and sleeve seams.

Sweet Corn

FOR DIRECTIONS SEE BOTTOM OF CARTON
FARM FRESH
SWEET CORN
WHOLE
SWEET CORN

By **BETTY JOHNSTON**, Field Officer in Rural Sociology, Department of Agriculture, Wellington

SWEET corn is being more widely used in New Zealand meals, its delicate flavour making it a favourite. Being a whole grain it is a good source of some valuable minerals and B vitamins which are so often lost in other processed cereals, and it is also a provider of heat and energy. Although corn is at its best when fresh from the garden, quick frozen, tinned, or home preserved corn may also be used not only in season but throughout the year.

SWEET corn can be grown successfully in most parts of the country, except in the far south of Otago and Southland. The harvesting season is from about the middle of January to the beginning of March, but it may be a few weeks longer in warmer areas.

The chief attraction of corn lies in its delicate flavour and this is inclined to be lost during long processing or when the cobs are harvested and stored for some time before use. Young, tender cobs freshly picked from the garden are the ideal, but careful selection, preparation, and cooking can do much to ensure the success of the many appetising and satisfying corn dishes.

Sweet corn need not be limited only to summer menus, for the canning and quick freeze processes make possible its use throughout the year. Tinned corn, creamed and whole kernel, is already cooked during processing and requires no further preparation other than heating, but quick frozen corn is merely blanched by being passed quickly through very hot steam before packing and needs to be cooked before serving. The directions on the packages should be closely followed, it being necessary to thaw the frozen cobs first to ensure even cooking throughout.

To prepare garden-fresh corn strip off the husks and silk and wash the cob thoroughly under cold running water or in salted water to remove dust and insects. Stand the cob on a board and cut the corn with a sharp knife. (See the illustration on page 91.) For creamed corn make a shallow cut down the whole length of the cob and scrape it with the back of the knife. Make the cut slightly deeper (about two-thirds of the depth of the grains) for the whole kernel corn and do not scrape the cob. Place the grains in a saucepan with a little boiling salted water and bring them to the boil. Simmer the corn for 5 to 7 minutes or until it is soft. Drain it before use.

It is possible to preserve corn at home by following carefully the directions given in the next section.

Home Preserved Corn

In home preserving corn only that which is freshly picked, young, and tender should be chosen. Any poorly developed or unsound cobs should be discarded. The cobs chosen should be washed well, a vegetable brush being used to remove the silk if necessary. Only 2 to 3 quarts of corn should be bottled at a time (6 to 8 small cobs yield about 1 quart of corn).

Creamed Corn

The following directions should be followed for creamed corn:—

1. Cut both ends from each ear of corn, remove the husks and silk, and wash the cob well.

2. Cut the corn from the cob with a shallow cut, using a sharp knife, and scrape the cobs with the back of the knife.

3. Measure the corn into a cooking pan, either a quart or pint measure being used. For every pint of corn add ½ pint of boiling water. Cover the pan and heat it to boiling point. For the water bath method continue cooking for 20 minutes.

4. Pack the corn immediately into hot, clean jars.

5. Add boiling cooking liquid to within 1in. of the top. Season each pint jar with ½ teaspoon of salt, plus 1 teaspoon of sugar if desired. A dessertspoon of lemon juice or clear vinegar may be added to each jar as a precaution against the development of bacterial poisons. **Its addition is essential if the processing is not done in a pressure cooker.** Fill only as many jars as will fit into the water bath or pressure cooker. Pack them evenly. Do not press the vegetables down, but shake the jars when they are being filled. The vegetables and water should be boiling hot. Work quickly. Put on the lids and process at once.

To process corn in a pressure cooker have the water just over the rack in the cooker. Leave 2in. spaces between the jars to allow the steam to circulate. Clamp on the cover, but do not close the vent. Heat the cooker quickly until all the air has been expelled and steam has been escaping steadily for a minute. Close the vent as is directed in the booklet accompanying the cooker. Pressure is regulated in some cookers by weights, the corresponding range of pressures being given in the instruction booklet. When using a pressure cooker for bottling pack it, clamp on the cover, and heat it as directed above, but do not place any weights in position until all the air

---

HEADING PHOTOGRAPH: Sweet corn in quick freeze package, in can, and in cob.

G5924.24

You can buy a

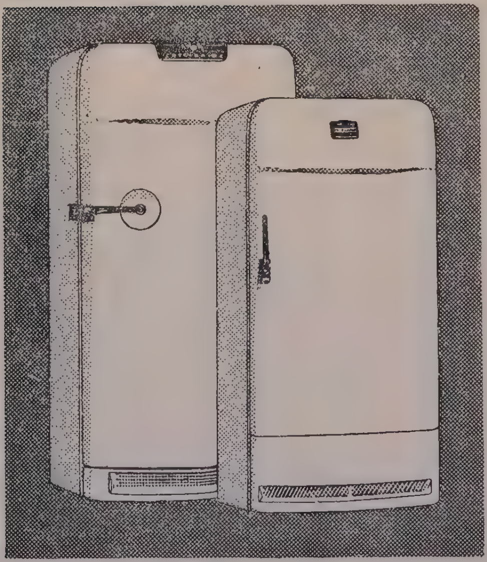
FRIGIDAIRE

REGISTERED TRADE MARK

Out-of-Income

Enjoy the benefits of having a "Frigidaire" in your home while you're paying for it. For a small deposit and convenient monthly payments you can have immediate delivery. See your nearest "Frigidaire" dealer about this buy-out-of-income plan.

A model to suit every size family . . .



For the smaller family, "Frigidaire" have designed the compact 5.5 cu. ft. model. Same graceful lines as the larger models, same wonderful features; "Meter-Miser" economy (costs less to run than an ordinary light bulb); Super Freezer; new type "Quickube" Ice Tray; Adjustable Cold Control; Semi-automatic Defrosting; Vegetable Hydrator, etc.

• •

The 7.4 cu. ft. model offers more usable inside space with less outside size. Compare its features with any other make; "Meter-Miser" economy; Super Freezer, holds 19.2 lbs. of frozen foods; "Quickube" Ice Trays, Meat Tender, to keep meat separate from other foods; Vegetable Hydrator; Adjustable Cold Control; Semi-automatic Defrosting.

AND for the larger family needing extra space, there's the 12 cu. ft. model.

Distributed by

FRIGIDAIRE **DIVISION OF GENERAL MOTORS NEW ZEALAND LIMITED**

Through a New Zealand-Wide Network of Authorised Frigidaire Dealers

is out and steam has been escaping freely for a minute. Close the vent by placing the weights in position. Allow the pressure to rise to the required figure (15lb.) and count the time from then. Allow 65 minutes at 15lb. pressure for pint jars and 75 minutes at 15lb. pressure for quart jars. Remember to adjust the heat to keep the pressure uniform.

At the end of the required time remove the pressure cooker from the heat and let the pressure fall to normal. Allow it to stand for 2 minutes and then slowly open the vent. Remove the cover, take out the jars, and complete the lid seal if necessary. Stand the jars well apart on a cloth or board and away from draughts, which may cause them to crack. Cool as quickly as possible.

Water Bath Method

In the water bath method the jars should be processed for about 20 minutes with the lid on the water bath. It should be kept boiling continuously. The water should be replenished if necessary. At the end of the required time remove the jars, complete the lid seal if necessary, and stand the jars to cool as previously described. Do not attempt to keep corn processed in this way for more than a few months.

Whole Kernel Corn

For whole kernel corn the procedure is as follows:—

1. Husk and clean as for creamed corn.

2. Cut the kernels from the cob with a clean stroke of the knife at about two-thirds of the depth of the kernels. Do not scrape the cob.

3. Pre-cook and pack the corn in jars as already described. If preferred, the whole cob may be pre-cooked for about 20 minutes and the corn removed after rather than before cooking.

Recipes Using Sweet Corn

Hot Dishes

Corn on the Cob

Husk and clean the fresh corn cob and place it in boiling salted water. Boil the cob for 5 to 10 minutes until it is soft. Using kitchen tongs remove the cob, drain it well, and place it on a hot plate. Serve it with butter, salt, and pepper.

Corn Roast

(a) Barbecue Method

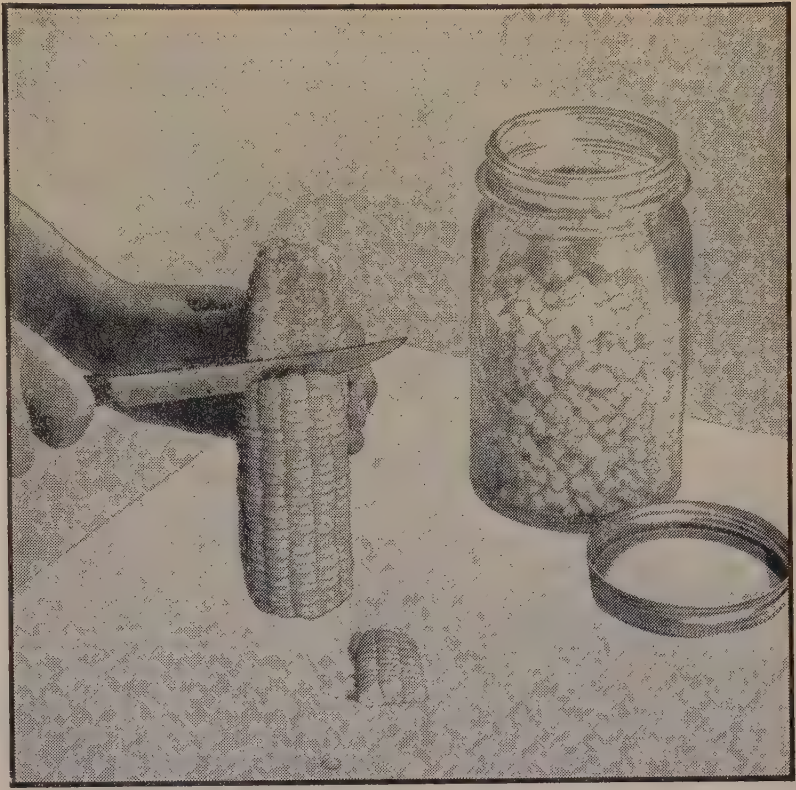
Leave the husks on the corn cobs, it is soft. Using kitchen tongs remove dust and insects, and drain them well. Put them on a grill and place it over hot, glowing coals. Allow about 10 minutes for roasting or until the cobs are steaming hot. Remove them with kitchen tongs and take off the husks. Serve with butter, pepper, and salt.

(b) Oven Roasting

Wash and drain the corn, leaving the husks on the cobs. Place them in a hot oven, about 450 degrees F., and roast for 10 to 15 minutes. Test them with a skewer. When they are soft remove them with kitchen tongs and take off the husks. Serve them with butter, pepper, and salt.

Corn on Toast

1 cup of uncooked, creamed corn (3 to 4 small cobs)
Pepper to taste
1½ tablespoons of butter
¼ teaspoon of salt



Preparing whole kernel corn for home preserving. The kernels are cut from the cob with a sharp knife at about two-thirds of the depth of the grains.

Mix the grain with the butter, pepper, and salt and heat in a saucepan until the corn is soft. Serve very hot on toast, or over half a grilled tomato on toast. Alternatively serve the corn in a small bowl with a poached egg on top. Garnish it with parsley.

Savoury Corn

¼ cup of minced onion
2 cups of cooked whole kernel corn (either fresh, tinned, or frozen)
½ teaspoon of salt
Pepper to taste
½ teaspoon of sugar
1 teaspoon of lemon juice
2 tablespoons of butter

Cook the onion in butter until it is tender; add the corn and other ingredients. Heat them and serve on hot buttered toast.

Curried Corn

1 cup of cooked creamed corn
½ tablespoon of butter
¼ teaspoon of salt
1 teaspoon of curry powder
¼ cup of milk

Melt the butter in a saucepan and add curry powder. Heat it for a few minutes and add the corn, milk, and salt. Serve the mixture when very hot on toast or with grilled tomatoes.

Corn Creole

1 small young marrow
2 cups of cooked corn (either creamed or whole kernel)
Pepper to taste
¼lb. of bacon, 4 medium tomatoes
1 tablespoon of butter
½ teaspoon of salt

Cut the marrow in halves lengthwise and remove the seeds. Dot the halves with butter, place them in a greased baking dish in a hot oven (about 400 degrees F.), and cook them until they are soft. Heat the corn, add salt and pepper, and place in the scooped-out hollows of the marrow. Grill the tomato halves and bacon rashers and place them on top of the corn. Serve the marrow with creole sauce, the recipe of which is given below.

Creole Sauce

2 dessertspoons of butter
2 dessertspoons of flour
1 small tin of tomato soup
½ teaspoon of salt
Pepper to taste
¼ cup of grated cheese
1 teaspoon of curry powder

Melt the butter in a saucepan, add the curry powder and flour, and heat for a few minutes. Remove the saucepan from the heat and add about a third of the tomato soup. Stir the mixture to a smooth paste, return it to the heat, and add the remainder of the soup and the salt and pepper. Heat it, stirring constantly. Lastly add the grated cheese and serve the sauce immediately.

Corn Chowder

¼ cup of finely cubed ham or bacon
1 medium sliced onion
1 cup of finely diced cooked potatoes
1 cup of boiling water
1 teaspoon of salt
1 packet of frozen corn (or 1 tin of whole kernel corn)
2 cups of milk
⅛ teaspoon of pepper
1 tablespoon chopped green pepper (or parsley)

Place the ham or bacon in a saucepan and cook it gently until it is crisp. Add the sliced onion and cook it until

Corn chowder served with small rolls of grilled bacon as a garnish.

it is golden brown. Add the potatoes, salt, and boiling water (or water in which frozen corn has been cooked). Heat the mixture and add the cooked corn. Lastly add the milk, pepper, and chopped green pepper (or parsley). Cook the chowder until it is thoroughly heated. Serve it in large soup bowls with very small rolls of grilled bacon as a garnish.

Corn Fritters

1 cup of cooked creamed corn
2 eggs, with yolks and whites separated
1oz. of flour, or more if the mixture is too moist
½oz. of butter for greasing the pan

Mix together all the ingredients except the stiffly beaten egg whites, which are folded in last. Drop spoonfuls of the mixture on a well-greased heated pan. Cook until they are golden brown. For deep fat frying add a little more flour (about ½ tablespoon) to make a stiffer mixture. Drain the fritters on clean, crumpled paper.

Corn Souffle

1½oz. of flour
1½oz. of butter
¾ pint of milk
½ teaspoon of salt

Melt the butter in a small saucepan, remove it from the heat, and add the flour, mixing it to a smooth paste with the butter. Return the saucepan to the heat and add about a third of the milk and the salt. Gradually add the remainder of the milk, stirring constantly until the mixture is thick.

Add

1 tin of drained, heated creamed corn
3 beaten egg yolks

Lastly fold in 3 stiffly beaten egg whites. Pour into an **ungreased** deep earthenware or overproof glass dish, leaving 1½ to 2in. space at the top to allow for the rising souffle. Stand the dish in a shallow pan of hot water and bake it in a moderate oven (350 degrees F.), using the bottom heat of the oven. The time required is about 45 to 60 minutes. Serve the souffle immediately.

Corn Party Savouries

A savoury corn mixture in small pastry patty cases or cream puff cases makes a delicious hot party savoury. Here is a mixture which may be made in advance and stored until it is needed. It also makes a sandwich spread for picnics or school lunches, and may keep in cold weather for several days or be stored in a jar in the refrigerator.

¼ cup of finely chopped or minced bacon
1 teaspoon of butter
¼ cup of finely diced celery
1 tin of creamed corn
¼ cup of chopped parsley
1 small, diced onion
½ teaspoon of salt
Pepper to taste

Cook the diced bacon in the butter until it is crisp, add the onion, and cook it until it is tender. Add the corn, celery, salt, pepper, and last, the parsley. Heat it through and store it in a covered jar. Serve this filling hot in pastry or cream puff cases or on fingers of crisp toast, or cold in sandwiches or on small cracker biscuits.

Corn may be served cold in salads either on its own in a cup of lettuce or mixed with cold green peas and wedges of cheese on lettuce leaves. A very welcome addition to the school lunch-box and the picnic basket, too, is a cold, cooked corn cob, rolled lightly in butter, pepper, and salt when hot and packed in greaseproof paper.

Geraniums Have Many Uses in Flower Garden

GERANIUMS are at their best in a hot, dry, sunny situation and during summer, when many other plants are inclined to wilt and droop with the heat, they produce cluster after cluster of brilliant glowing flowers. There are few plants which equal the geranium for creating an effective display, or for ease of handling in the garden. In this article M. J. Lockie, Horticultural Instructor, Department of Agriculture, Auckland, discusses these useful and popular plants. Flower garden work for February is dealt with by H. P. Thomas, formerly Horticultural Instructor, Department of Agriculture, Wanganui.

[*Douglas Elliott*

Pink flowered ivy-leaved pelargonium trained over a tree stump.

GERANIUMS originally grew wild in South Africa. From these first species many interesting and attractive forms have been developed, some for their distinctly marked and coloured foliage and others for the beauty of their flowers, which range through dazzling oranges, scarlets, and reds to delicate pinks and pure white.

This large group of garden plants known as geranium is botanically classified as pelargonium, although the name geranium is still in frequent use.

Types and Varieties

Pelargoniums fall naturally into 4 main types:—

1. Zonal pelargoniums (*Pelargonium hortorum*), known as geraniums, are the most widely grown of the four types. Zonal pelargoniums have an upright shrubby habit of growth, and flower prolifically throughout summer until the first frosts. Their rounded foliage in many cases bears concentric bands of colour, which vary in intensity depending on the variety. From this marking the name zonal has arisen.

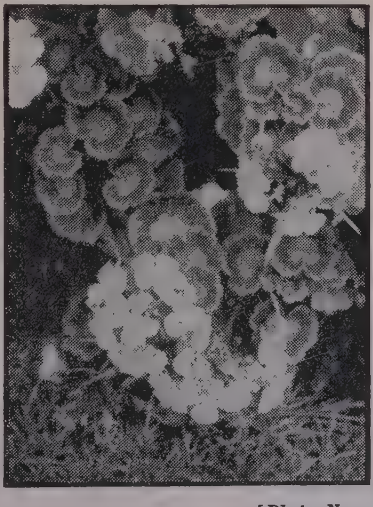
2. Show or regal pelargoniums (*Pelargonium domesticum*), known as pelargoniums, flower through spring and early summer. The individual flowers of a cluster are larger than those of the previous type and usually have a darker colour in the throat. Their habit of growth is more spreading and the foliage is pointed with serrated edges and clearly defined veins.

3. Ivy-leafed pelargoniums (*Pelargonium peltatum*). The dark glossy green leaves, as the name implies, are ivy shaped and are attractive in themselves. This type of geranium provides most of the trailing or climbing plants which flower freely during spring and summer.

4. Scented - leaved pelargoniums belong to several species, and are grown for their foliage, which is deeply cut, crisp, and neat, and which, when crushed, has a delicate fragrance. The small rose or lavender coloured flowers are insignificant, but a well-shaped plant is attractive throughout the year.

With so many varieties, many of them improvements on old varieties, it is not necessary to keep the smaller-flowered forms in the garden unless they are required for a special purpose. Larger-flowered pelargoniums give an infinitely better display of colour for the same amount of care and attention, and no matter how much care is expended on a small-flowered form the size of its flowers cannot be increased.

To mention a few of the commonly grown varieties, Maxim Kovalisky and Paul Crampel, two brilliant orange- and red-flowered zonal pelargoniums, are well known for their vivid summer display. Charles Turner and Mme. Crousse, two pink-flowered ivy-leaved pelargoniums, are effective in the garden and most useful for cutting. They last well in water provided the flowers are cut while the petals are still unfolding.



[*Photo News*

Gold, green, and brown can be seen on the foliage of a variegated zonal pelargonium.

Mme. Salleroi, although not like the other pelargoniums, is widely grown as an edging plant, its soft green, cream-banded foliage making a neat border.

Pelargoniums require a hot, dry sunny situation in average to poor garden soil, and a position where they will be protected from heavy frost.

Ivy-leaved and show pelargoniums prefer shade during some part of the day and for this reason are useful for planting under trees.

Light frost may blacken the tips, but in most cases they will come away the following spring. Waterlogged soil and wet conditions are causes contributing to failure; branches may even blacken and rot under these conditions. Poor flowering can often be attributed to insufficient sunlight.

Pelargoniums have innumerable uses and each garden, from the beach cottage to the farm garden, has some position which would be suitable for them, and where they would create an arresting display during their flowering season.

Fly via Australia and the East !

Now free choice of

26 Famous Cities—

on a variety of alternate routes across

EUROPE

No Reserve Bank authority for fare required when flying the Kangaroo Service to Britain.

- ★ See world-famous Eastern, Mediterranean and European cities en route.
- ★ Break your journey wherever you wish—no additional air fare.
- ★ World's most experienced international airliners—comfortable air-conditioned Constellations.
- ★ Excellent food, complimentary dinner wines in flight, attentive cabin service first class accommodation at night stops.

Start your journey from Auckland, or Wellington, or Christchurch. TEAL services connect all three cities with QANTAS - B.O.A.C. "Kangaroo" route. Six services weekly from Sydney

Inquiries: Leading Travel Agents or TEAL Auckland Wellington, Christchurch.

QANTAS AND B·O·A·C

QANTAS EMPIRE AIRWAYS LIMITED in parallel with BRITISH OVERSEAS AIRWAYS CORPORATION

KNZ11a

HARDWOODS

FOR FARMERS

We ship or rail to anywhere in N.Z. ex stock or indent. Try us if wanting timber for gates, posts, bridges, or general purposes. No order too small.

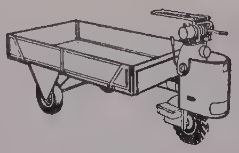
The C. & A. ODLIN

Timber & Hardware Co. Ltd.

Wellington, Petone, Palmerston North, Hastings, Napier, Gisborne, Tauranga, Newmarket, Otahuhu, Glen Eden and Nelson.

Telegrams: "Odlins".

TRUC-TRACTA



Lead it or ride it, either way it provides mechanised handling at its very lowest cost. Ideal for light carting jobs up to 8cwt. on good surfaces.

MATERIALS HANDLING Co. Ltd.
Gracefield, LOWER HUTT.

NEW ZEALAND'S

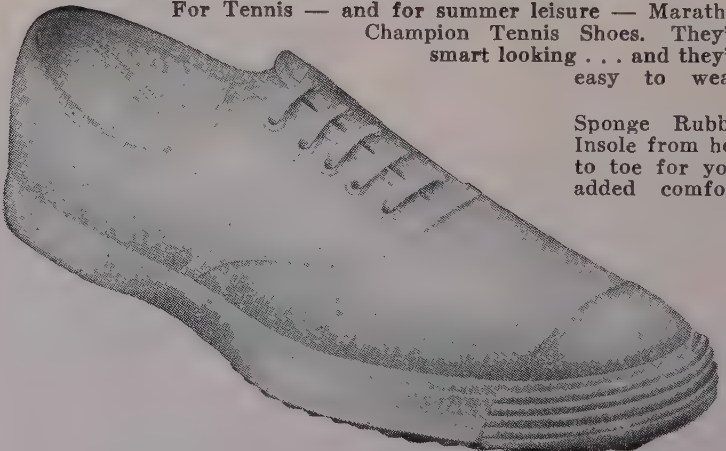
Finest Tennis Shoe -The

MARATHON

CHAMPION

For Tennis — and for summer leisure — Marathon Champion Tennis Shoes. They're smart looking . . . and they're easy to wear!

Sponge Rubber Insole from heel to toe for your added comfort.



Made by MARATHON RUBBER FOOTWEAR LTD.
A Manufacturing Division of Skellerup Industries Ltd., CHRISTCHURCH.

Pelargoniums are perennials, and as such can be included in shrub borders or planted in permanent positions on dry banks. They make attractive low hedges and some striking colour contrasts may be had by planting them along painted fences or near house walls.

Climbing varieties, particularly ivy-leaved geraniums, make most effective screens over trellis, where the flowers show to advantage and the leaves create an interesting pattern. They are also used extensively to cover embankments or roadside borders which are sometimes difficult to manage or to plant satisfactorily.

Zonal geraniums may be grown as annuals where bedding schemes are used. Rooted cuttings are planted out in spring after the danger of frost is over. These flower throughout summer and in autumn when they are removed fresh cuttings are taken from them to be rooted and grown ready for the next season.

Once planted in a suitable situation pelargoniums require little attention beyond pruning each year after flowering. In districts subject to frosts pruning may be left until growth is about to start. All weak spindly growth and any diseased material should be removed, and the remaining branches reduced to ½ or ⅓ of their length to ensure a vigorous well-branched bush the following season.

Removal of spent flower heads is a form of pruning, and when carried out prolongs the duration of flowering.

Where frosts are severe zonal pelargoniums (geraniums) used in bedding schemes may be lifted and trimmed back to 6in. They can be heeled in under the shelter of a hedge or trees or held over in boxes of sand or soil in a shed and then planted out again in spring. When plants are stored in this way care must be taken to see that soil and plants are kept reasonably dry. Cuttings can be made from the tops cut from the plants and may be rooted in a frost-free position or under the bench in a glasshouse.

Propagation

Cuttings of pelargoniums root readily and can be taken at any time of the year, though spring and autumn are the best times.

Well-shaped bushes come from short cuttings 3in. to 4in. long, taken from the tips of a branch, and having three or four leaf buds. These cuttings should be trimmed with a straight cut just below a joint and the lower leaves and stipules removed before planting. Heel cuttings may be taken, where a side branch is pulled off the main stem and a piece of the old stem adheres to it, or trimmed cuttings may be made of pieces of older wood.

With pelargonium cuttings better results are gained if they are taken one day and then left aside a day or so before planting. This allows the cut end to dry out a little, which makes it more resistant to decay.

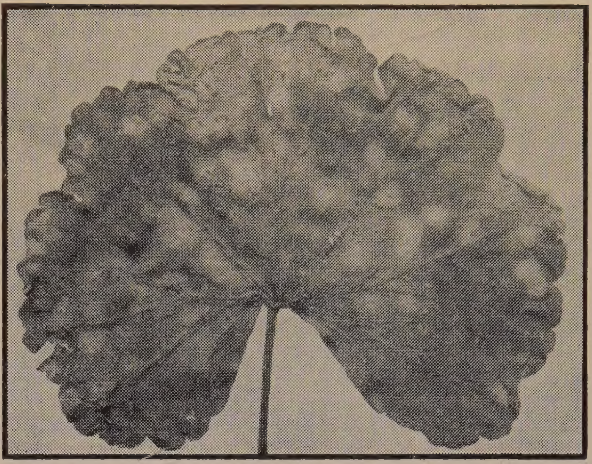
As with most other cuttings each piece should be placed in the soil to two-thirds of its length, and the soil should be firmed about its base. Nothing is gained by having cuttings too long; 3in. to 8in. is sufficient.

Where cuttings are rooted in boxes of soil or sand it is imperative to ensure adequate drainage. Too wet conditions cause rotting of foliage and eventual death of the cutting. When watering becomes necessary the water should be applied to the ground and the foliage kept dry.

Diseases and Pests

Pelargoniums are little affected by disease and have few pests. Poor drainage and too moist conditions are a primary source of trouble, causing blackening of the stems and gradual rotting and death of the plant.

Rust (*Puccinia pelargoni* var. *zonalis*) frequently attacks zonal pelargoniums, and can be readily identified by the red-brown circular spots on the undersides of the leaves, often accompanied by slight fading of the colour on the upper leaf surface.



Geranium leaf attacked by rust, showing yellow spots on the upper leaf surface.

Where rust is observed plants should be sprayed with 4 fluid ounces of lime sulphur plus 1 fluid ounce of colloidal sulphur to 4 gallons of water to prevent the rust spreading to unaffected leaves.

Where lime sulphur spray is used near buildings care must be taken to see that the spray does not get on the paint, as a brown stain occurs which is unsightly and difficult to remove.

Caterpillars are often responsible for holes chewed in the leaves. For these the control is to spray the foliage with 50 per cent. wettable D.D.T. at 1oz. to 4 gallons of water or to use a D.D.T. dust.

Pot or Box Pelargoniums

Pot or box grown pelargoniums are fast regaining popularity. Where they are grown in this manner the flower pot, window box, or tub must be adequately drained by a layer of either scoria, shingle, or broken crock being placed at the bottom of it. These plants should be pinched back early to develop sturdy bushes which will carry a good number of flowering branches.

Soil in the containers should be allowed to dry out between each watering and foliage should be kept as dry as possible.

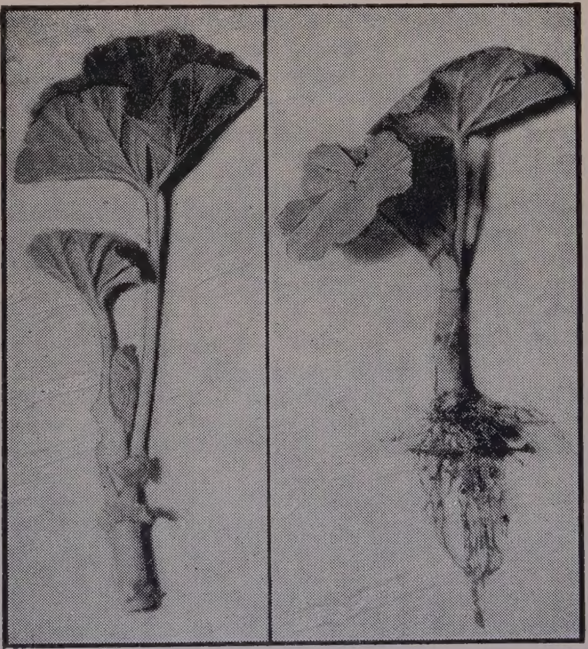
Pot-grown plants indoors will not flower unless they are in strong light and receive a certain amount of direct sunlight.

Reference

"The Book of the Geranium", John E. Cross.

Flower Garden Work in February

February is an important month in the gardener's calendar, because serious thought must then be given to the planting of spring flowering bulbs in rock gardens, mixed borders, special beds, or in bowls or pots for indoor display. The wise gardener



Tip cuttings of geranium prepared for insertion in frame (left) and well rooted (right).

should now have his bulb requirements on hand for planting at the end of February or during March.

Bulbs for Outdoor Display

Bulbs generally are most successful when grown in a fairly rich but light and well-drained soil in full sun. If it is procurable, well-decayed farmyard manure should be incorporated into the beds well in advance of planting, but alternatively other organic material may be used in conjunction with light applications of bonedust, blood and bone, and superphosphate. Heavy soil should be deeply dug and lightened by the addition of a quantity of strawy material and clean sand.

Early planting does not necessarily mean earlier flowering, but it does give the bulbs a chance of establishing a better rooting system capable of producing better blooms than bulbs put in late. In addition to the always popular tulips, hyacinths, narcissi, freesias, and lachenalias, it would be wise for the home gardener to plant some ixias and Dutch iris to extend the flowering period into early summer.

Bulbs in Containers for Indoor Display

Hyacinths, tulips, and narcissi are very suitable bulbs to plant in pots or bowls for indoor decoration during late winter and early spring. Ordinary potting compost is suitable for bulbs when grown in pots or containers with drainage holes, but where drainage is not provided the bulbs are better grown in bulb fibre, which is obtainable from most seedsmen. As dry bulb fibre is difficult to wet properly, it is advisable to soak it in a bucket of water overnight and then to squeeze out the surplus water before using it. Firm planting is necessary and tulip bulbs should be planted with their "noses" level with the surface of the soil, but hyacinths and narcissus bulbs need only to be partly covered with soil. After being potted up the containers should be placed outside in the coolest part of the garden, either buried to the rims or standing on the surface and if they have drainage holes, they should be watered. They should be covered with old fine cinders, soil, or sacks to keep the containers and their contents cool and moist for about 6 weeks. This treatment reduces drying out and allows the bulbs to produce roots before shoot growth begins.

Cuttings

Cuttings of many plants root well in late summer, but gardeners should propagate only from those plants which are making a worthwhile showing. It is well to remember that a poor plant takes up as much space as a good one.

Rooting hormones facilitate the rooting of many of the more difficult ones and these should be used according to the maker's directions for the best results.

The following are some of the plants which may be propagated from cuttings at present: Pentstemons, hydrangeas, geraniums, fuchsias, dianthus species, marguerites, lavender, pelargoniums, catmint, aubrietia, viola, ericas, heaths, and many rock plants.

The use of some type of frame or inverted glass jars as coverings is advisable to ensure that the moist atmosphere around the cuttings is maintained to prevent flagging and assist rooting.

Cuttings of shrubs and many of the plants listed which may have been inserted in a frame last month should be inspected regularly and sprayed when necessary with water to reduce wilting until the "slips" have developed roots. The first sign that the cuttings have formed roots is the appearance of fresh green growth at the extremity of the cutting. When rooting has taken place the frame light should be left off and the young plants allowed to grow naturally until they can be planted out, either into an odd corner of the garden to grow on or directly into their permanent quarters. The sooner they are planted out the better, but if the weather is really dry, several waterings will be necessary from the frame to planting out.

Watering

Perhaps no garden plants show the ill effects of hot and dry weather more quickly than many of the herbaceous perennials, and watering may now be necessary in the mixed or herbaceous border. If water is scarce, it is better to soak different parts of the border thoroughly in succession rather than to give a light sprinkling over the whole area. Where possible beds or borders are better watered by small irrigating channels than by overhead sprinkling. Shallow channels may be made with a draw hoe, and by regulation of the flow of water to a specified area good penetration can be obtained in a comparatively short time. Water sprinkled on the surface can do more harm than good, as much of it will evaporate and plant roots are encouraged to the surface with the result that they suffer severely during the next dry spell. Four gallons of water to the square yard, equal to 1in. of rain, should penetrate a depth of about 10in. and suffice for all plant needs for about 2 weeks. Several hours after such watering or after rain the ground should be lightly hoed (often termed a dry mulch) to prevent the formation of a hard surface crust.

Gladiolus

The very early plantings which were flowering soon after Christmas should be lifted as soon as the leaves show any marked change in colour, which occurs about 6 weeks after flowering.

After lifting, the plants should be thoroughly ripened off by spreading them out or hanging them up in a dry, airy place. Later the old corms and tops should be removed and a reasonable clean-up given to the new corms before storing them away in shallow trays for the winter.

Autumn Sowing of Sweet Peas

Now is the time to prepare the bed for an autumn sowing of sweet peas to be planted in March at the latest.

The cultivation of sweet peas is not difficult, but the plant responds well to liberal treatment and constant attention. For best results select a position which will receive the maximum amount of sun, and cultivate it deeply, manure it liberally, and see that good drainage is provided.

Though a thoroughly worked soil is advocated, sweet peas do better in a firm root run than in loose or spongy soil. Preparations for planting should therefore be carried out as early as possible before sowing or planting. The area should be dug a depth of two full spade blades and well-decayed cow manure, farmyard manure, or other organic material should be incorporated into the bottom spit. At the same time a mixture of equal parts of bonedust and superphosphate at 4oz. to the square yard should be worked into the topsoil. The seed of sweet peas may be sown in January, preferably in paper pots to avoid undue disturbance at planting time.

Iceland Poppies

As soon as the seedlings from the January sowing are large enough to handle they should be pricked out about 2in. apart in boxes.

Early planting gives the best results, for the blooms are at their best if produced early in spring, when they are keenly sought as a cut flower. The beds for the final planting require to be well prepared and slightly raised for planting at this time of the year. The soil for the beds needs to be well enriched with farmyard manure or organic material, and then dusted with lime well in advance of planting.

Before planting, a fertiliser mixture of equal parts of superphosphate, blood and bone, and sulphate of ammonia at 2oz. to the square yard should be well raked into the surface. Plant at 12in. to 15in. apart each way after the bed has been made firm.

Marguerites

Marguerites (Paris or tree daisies) are useful garden plants for the milder districts, for with good attention they may be induced to flower throughout most of the year. Periodical trimming back fairly severely is necessary to keep them from becoming ungainly and to produce young growth for flower production.

A late summer trimming at present will encourage the production of new shoots which should flower after the last of the chrysanthemums and dahlias. An alternative is the raising of new plants each season from cuttings which may be taken at present.

Treated in either of these ways, marguerites are valuable subjects which will repay attention.

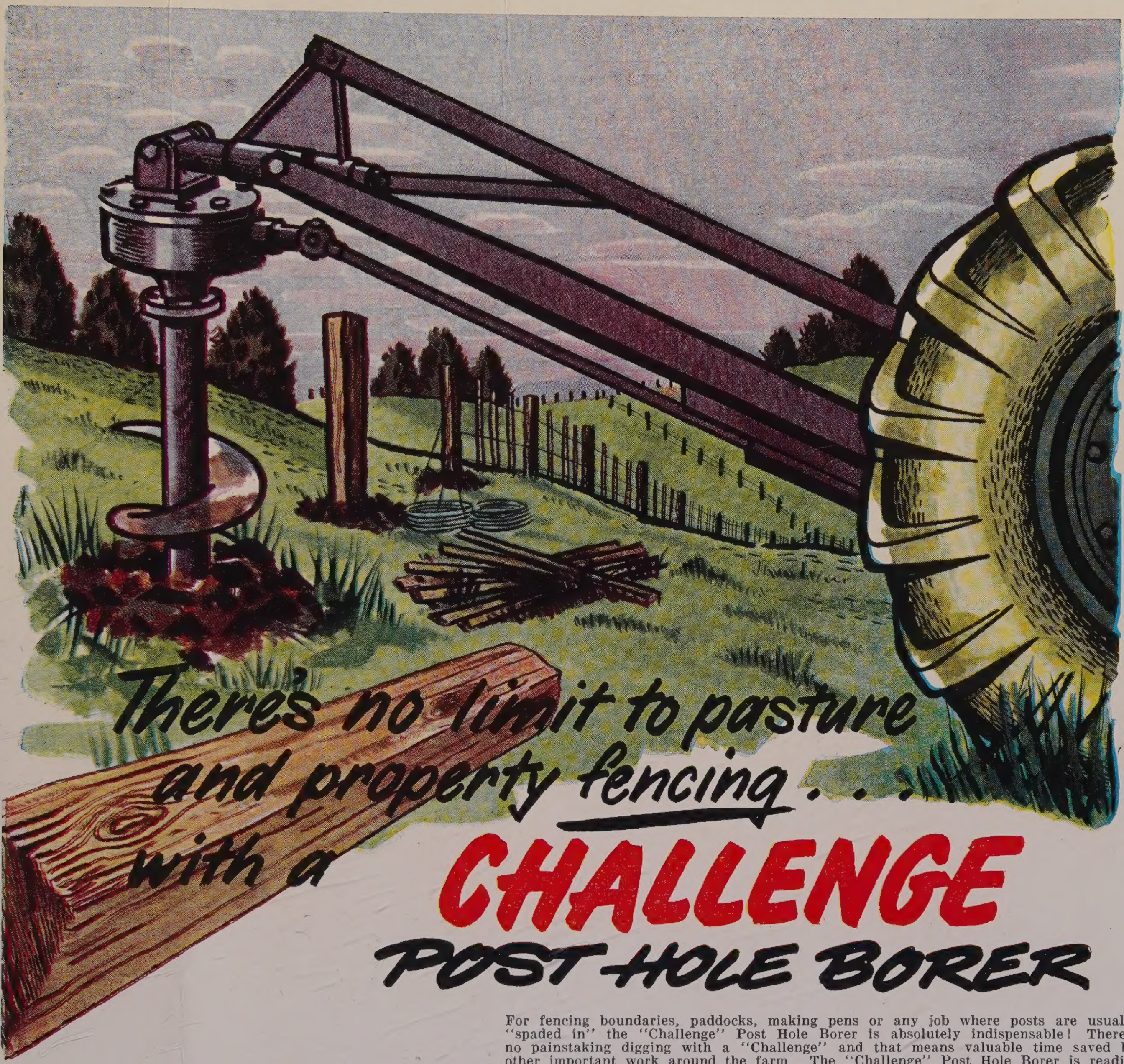
Chrysanthemums

Chrysanthemums in borders or pots will need disbudding now.

Disbudding, which results in larger flowers, is done by removing unwanted flower buds, usually the smaller side ones when they are not larger than about pea size, and as a result a better supply of food is obtained by the remaining buds. On the other hand heavy thinning of buds tends to shorten the flowering period, as there are fewer flowers to open after the first ones fade. Unless fine individual blooms are wanted, little disbudding need be done on chrysanthemums grown for garden display.

Some single varieties are best partly disbudded by having all but the top three or four buds on each stem removed; but many gardeners take the easy way and grow chrysanthemums without any attention in this respect and get blooms in quantity, although lacking somewhat in quality.

Printed by Blundell Bros. Ltd. (The Evening Post), Wellington, by authority R. E. Owen, Government Printer.



There's no limit to pasture and property fencing . . . with a CHALLENGE POST-HOLE BORER

For fencing boundaries, paddocks, making pens or any job where posts are usually "spaded in" the "Challenge" Post Hole Borer is absolutely indispensable! There's no painstaking digging with a "Challenge" and that means valuable time saved by other important work around the farm. The "Challenge" Post Hole Borer is readily attached to any make of tractor in just 3 minutes and is easily operated by one man. And here's a feature hill country farmers will really appreciate—the "Challenge" automatically bores plumb holes on slopes because it is self-plumbing! The extreme flexibility of this post hole borer is yet another grand advantage as it allows holes to be bored at the required angle regardless of the tractor's position.

Whether you are erecting a new fence line or repairing an existing one the "Challenge" Post Hole Borer available in either type "U" (Universal) or type "H" (Hydraulic) is the very machine you have been looking for! Write now for a free illustrated pamphlet on the "Challenge" to:

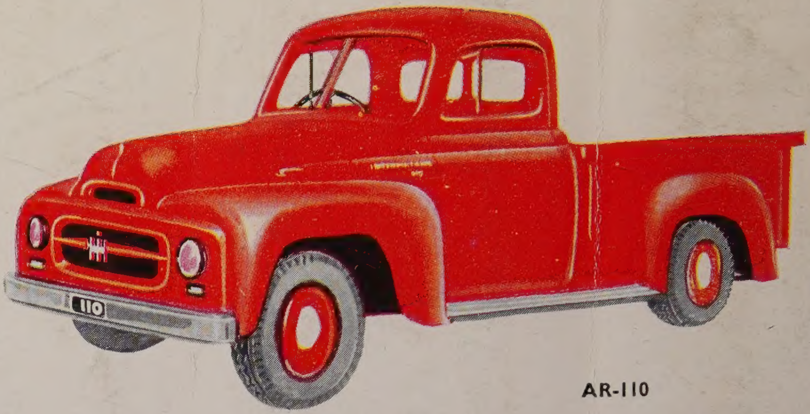
Available in either type "U" or type "H", both of which can be easily, quickly fitted to any make of tractor.

MASTER NEW ZEALAND DISTRIBUTORS

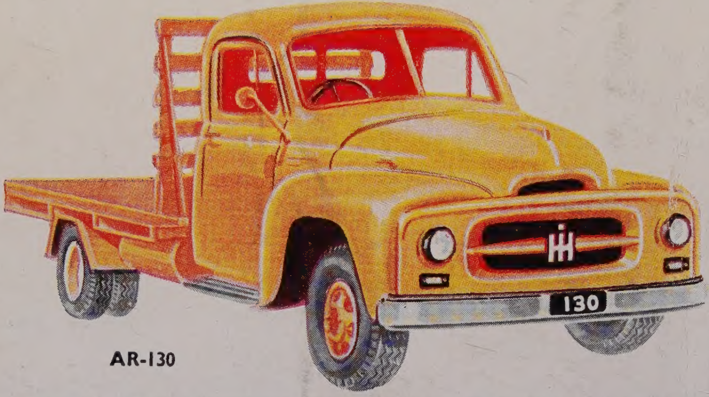
CHALLENGE
ESTABLISHED 1861

Wright Stephenson
& COMPANY, LTD.

the three R's



AR-110



AR-130

AR-110 Series: Mainly for light goods cartage. 12 to 20 cwt. carrying capacity. Wheelbase 115 inches and 127 inches.

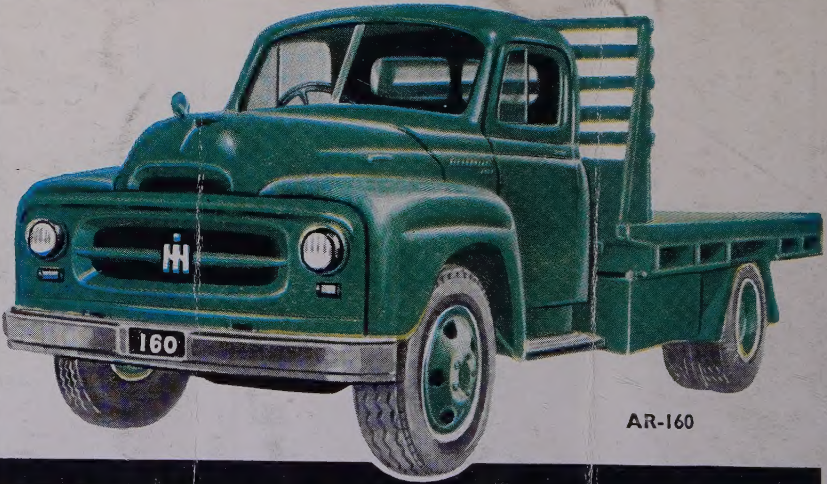
AR-130 Series: Mainly for town deliveries. GVW 8,000 lbs. 30 cwt. carrying capacity. Wheelbase 134 inches. Low loading on 16 inch tyres.

AR-160 Series: Mainly for heavier duty, long-distance transport. GVW 16,000 lbs. to 21,000 lbs. Wheelbase 154 inches and 172 inches. Optional 2-Speed Eaton axle if required.

THE NEW MODELS

are now going into action in New Zealand. The "3 R's" are three Series of AR-Line trucks, bringing you the latest in IH truck design, specialized to suit your own particular job.

These Rugged, Road-Proved, Reliable AR-Line models, built as only IH can build them, are heavy-duty engineered to give you years of dependable versatile service.



AR-160

SEE YOUR LOCAL IH COMPANY DEALER FOR FULL FACTS

INTERNATIONAL IH TRUCKS

INTERNATIONAL HARVESTER CO. OF N.Z.. LTD., P.O. BOX 563, CHRISTCHURCH.